

Department: Mathematics

Course Name: Honors Multivariable Calculus

Course Description:

Multivariable Calculus is equivalent to a third semester college calculus course. The course covers topics in Multivariable Calculus including - three-dimensional vector spaces, vector value functions, partial derivatives, multiple integrals and vector calculus. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally, and to make connections among these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions. An emphasis on critical thinking, complex communication, collaboration, creativity, and risk-taking while promoting a global perspective will prepare students for rigorous college work.

Content:

Parametric, polar and vector valued functions

Three-dimensional coordinate systems

Parametric equations of lines

Partial derivatives

Multiple integrals

Divergence theorem

Green's theorem

Stokes theorem

Skills:

Analyze graphs

Use calculus to solve problems expressed in parametric, polar, or vector forms

Solve mathematical problems: verbally, graphically, and algebraically and using tables

Calculate partial and directional derivatives

Calculate gradients

Use Lagrange multipliers to optimize functions subject to constraints.

Calculate multiple integrals

Use Jacobians in multiple integration

Apply the concept of a multiple integral to real world problems

Calculate integrals using Green's Theorem, Divergence Theorem, and Stoke's Theorem

Text and Materials:

Anton, Bivens, Davis, et.al., Calculus (John Wiley and Sons, 9th ed., 2009)

Methods of Instruction:

Small group discussion

Videos

Computer algebra systems

Desmos activities

Methods of Evaluation:

Summative assessments

Daily work