

Syllabus. Multivariable Calculus.

Edwards, Henry C., and David E. Penney. Multivariable Calculus. 6th ed. Lebanon, IN: Prentice Hall, 2002.

- Vectors and matrices.
 - Vectors, dot product, determinants, cross product.
 - Matrices, inverse matrices.
 - Square systems, equations of planes.
 - Parametric equations for lines and curves.
 - Velocity, acceleration, Kepler's second law.

- Partial derivatives
 - Level curves, partial derivatives, tangent plane approximation.
 - Max-min problems, least squares.
 - Second derivative test, boundaries and infinity.
 - Differentials, chain rule.
 - Gradient, directional derivative, tangent plane.
 - Lagrange multipliers.
 - Non-independent variables.
 - Partial differential equations.

- Double integrals and line integrals in the plane.
 - Double integrals, double integrals in polar coordinates, applications.
 - Change of variables.
 - Vector fields and line integrals in the plane.
 - Path independence and conservative fields.
 - Gradient fields and potential functions.
 - Green's theorem.
 - Flux, normal form of Green's theorem.
 - Simply connected regions.

- Triple integrals and surface integrals in 3-space.
 - Triple integrals in rectangular, cylindrical and spherical coordinates, surface area.
 - Vector fields in 3D, surface integrals and flux.
 - Divergence theorem, applications.
 - Line integrals in space, curl, exactness and potentials.
 - Stokes' theorem.
 - Topological considerations, Maxwell's equations.