

## MATH 226 - CALCULUS III - FALL 2017

TEXT: Essential Calculus (Second Edition), by James Stewart, published by Cengage Learning /Thompson/Brooks-Cole. ISBN-10: 1-133-11229-3, ISBN13: 978-1-133-11229-7. [This is the same as the text used in Math 125 and 126.]

COURSE OUTLINE: The course extends the single variable techniques and results of Calculus 125 and 126/127/129 to a several dimensional setting. Chapter 10 introduces vectors in 2 and 3 dimensions and then deals with vector valued functions and curves in 2 and 3 dimensional space. Chapters 11 and 12 deal with differentiation and integration for scalar valued functions of several variables. Finally Chapter 13 takes the (one-dimensional) fundamental theorem of calculus, which says that integration and differentiation are inverse operations, and generalizes it to 2 and 3 dimensions in three different ways to get Green's theorem, Stokes' theorem and the divergence (or Gauss') theorem.

CHAPTER 10 VECTORS AND THE GEOMETRY OF SPACE: Sections 10.1 to 10.8. Coordinate systems in 2 and 3 dimensional space, vectors, dot product, cross product, equations of lines and planes, cylinders and quadric surfaces, vector functions of a scalar variable, space curves, derivatives and integrals of vector functions, arc length. (The material in Section 10.8 on curvature is optional.) 9 lectures.

CHAPTER 11 PARTIAL DERIVATIVES: Sections 11.1 to 11.8. Functions of several variables, limits, continuity, partial derivatives, tangent planes and linear approximations, chain rule, directional derivatives and gradients, maximum and minimum values, Lagrange multipliers. 10 lectures.

CHAPTER 12 MULTIPLE INTEGRALS: Sections 12.1 to 12.7. Double integrals and iterated integrals over rectangles and general regions, double integrals using polar coordinates, applications, triple integrals using rectangular, cylindrical and spherical coordinates. (Section 12.8: change of variables for multiple integrals is optional.) 9 lectures.

CHAPTER 13 VECTOR CALCULUS: Sections 13.1 to 13.9. Vector fields, line integrals, conservative vector fields, Green's theorem, curl and divergence, parametric surfaces, surface area, surface integrals, Stokes' theorem, divergence theorem. 11 lectures.

The number of lectures on each chapter is a suggestion. Some professors may spend more time on some topics and less on others. The suggested total of 39 lectures leaves some time available for midterm tests and review.