

SYLLABUS

MATH 22005 – Analytic Geometry & Calculus III

(4 Credit Hours)

Catalog Information:

Study of functions of several variables, including partial derivatives and multiple integrals.

Prerequisite: MATH 12003.

Text: *Essential Calculus*, 2nd edition, by James Stewart

Text Web Site: <http://www.stewartcalculus.com/>

Chapter 10: Vectors and the Geometry of Space (11 days)

§10.1 Three dimensional coordinate systems

§10.2 Vectors

§10.3 Dot product

§10.4 Cross product

§10.5 Equations of lines and planes

§10.6 Cylinders and quadric surfaces

§10.7 Vector functions and space curves

§10.8 Arc length and curvature *

§10.9 Motion in space*

Chapter 11: Partial Derivatives (15 days)

§11.1 Functions of several variables

§11.2 Limits and continuity

§11.3 Partial derivatives

§11.4 Tangent planes and linear approximations

- Differentials*

(MATH 22005 Syllabus, continued)

§11.5 Chain rule

§11.6 Directional derivatives and the gradient vector

§11.7 Maximum and minimum values

§11.8 Lagrange multipliers*

Chapter 12: Multiple Integrals (11 days)

§12.1 Double integrals over rectangles

§12.2 Double integrals over general regions

§12.3 Double integrals in polar coordinates

§12.4 Applications of double integrals

§12.5 Triple integrals

§12.6 Triple integrals in cylindrical coordinates

- introduction to cylindrical coordinates
- triple integrals

§12.7 Triple integrals in spherical coordinates

- introduction to spherical coordinates
- triple integrals

§12.8 Change of variables in multiple integrals*

Chapter 13: Vector Calculus (18 days)

§13.1 Vector fields

§13.2 Line integrals

§13.3 Fundamental theorem for line integrals

§13.4 Green's theorem

§13.5 Curl and divergence

§13.6 Parametric surfaces and their areas

§13.7 Surface integrals

§13.8 Stokes' theorem

(MATH 22005 Syllabus, continued)

§13.9 Divergence theorem

Reviews and Exams (4 - 5 days)

*items are optional.