COURSE #: 21200 **COURSE TITLE: Calculus II with Introduction to Multivariable Functions** CAREER: undergraduate CATEGORY: regular TERM OFFERED: Fall, Spring, Summer PRE-REQUISITES: C or better in Math 20100 or placement by the department PRE/CO-REQUISITES: HOURS/CREDITS: 4HR/WK; 4 CR DATE EFFECTIVE: 01/01/20 COURSE SUPERVISOR: Chun Park	**CATALOG DESCRIPTION:** Techniques of integration, improper integrals, infinite sequences and series, parametric equations, vectors and the geometry of space, functions of several variables and partial differentiation. Text: Thomas' Calculus: Early Transcendentals (14th ed.), Haas, Heil, and Weir (Pearson).

Topics and Allotted Times

Suggested Periods	Section	Topics
1	7.1	The Logarithm Defined as an Integral
1	7.3	Hyperbolic Functions
1	8.1	Using Basic Integration Formulas
2	8.2	Integration by Parts
1	8.3	Trigonometric Integrals
2	8.4	Trigonometric Substitution
1.5	8.5	Integration of Rational Functions by Partial Fractions
1	8.7	Numerical Integration (omit error estimates)
2	8.8	Improper Integrals
1	10.1	Sequences
1.5	10.2	Infinite Series (omit Ex. 5)
1.5	10.3	The Integral Test (omit error estimates)
2	10.4	Comparison Tests
1.5	10.5	Absolute Convergence; The Ratio and Root Tests
2	10.6	Alternating Series and Conditional Convergence
2	10.7	Power Series (omit multiplication of series)
2	10.8	Taylor and Maclaurin Series
1	10.9	Convergence of Taylor Series (omit Theorem 24)
0.5	10.10	The Binomial Series and Applications of Taylor Series (cover Evaluating Non-elementary Integrals only)
2	11.1	Parametrizations of Plane Curves
2	11.3	Polar Coordinates
1	12.1	Three-Dimensional Coordinate Systems
1**.5**	12.2	Vectors (omit applications)
1.5	12.3	The Dot Product (omit work)
1.5	12.4	The Cross Product (omit torque)
2.5	12.5	Lines and Planes in Space
2.5	12.6	Cylinders and Quadric Surfaces
1	14.1	Functions of Several Variables
2	14.2	Limits and Continuity in Higher Dimensions (omit computing epsilon-delta, only cover ε-δ definition)
1.5	14.3	Partial Derivatives

COURSE LEARNING OUTCOMES

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After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. Use advanced integration techniques.	a
2. Define and calculate improper integrals.	a, e1, e2
3. Analyze infinite series for convergence using a range of tests.	a, e1, e2
4. Represent functions with power series and find their intervals of convergence.	a, b, c, e1, e2
5. Model spatial problems with vectors, lines, planes, curves and surfaces in space.	a, b, c
6. Differentiate multivariate functions.	a, b

COURSE ASSESSMENT TOOLS

1. Term average, based mostly on in-class examinations: 60% of grade
2. Comprehensive written final exam: 40% of grade.

DEPARTMENTAL LEARNING OUTCOMES

The mathematics department, in its varied courses, aims to teach students to

a. perform numeric and symbolic computations
b. construct and apply symbolic and graphical representations of functions
c. model real-life problems mathematically
d. use technology appropriately to analyze mathematical problems
e. state (e1) and apply (e2) mathematical definitions and theorems
f. prove fundamental theorems
g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument