

Course Title: Advanced Calculus II
Course Number: Math 32404

Prerequisites: Math 32300 and Math 34600

Catalog Description: A second semester of advanced calculus, with emphasis on topics in multi-variable calculus.

Sequences, continuity, compactness, completeness, differentiation and integration in \mathbf{R}^n , implicit and inverse function theorems, line and surface integrals, theorems of Green, Gauss and Stokes.

Text: [Basic Analysis: Introduction to Real Analysis](https://www.jirka.org/ra/), volumes 1 and 2, by Jiří Lebl. (Freely available from <https://www.jirka.org/ra/>)

COURSE LEARNING OUTCOMES

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. state the definitions of basic terms in beginning analysis of several real variables and the topology of n-dimensional real space , and use them in computations and proofs	a, b, e1, e2, g
2. analyze the properties of given functions and sets	a, b, e2
3. construct examples and counterexamples	b, e2
4. state and apply the Chain Rule, Mean Value Theorem, Taylor's Theorem, and Implicit Function Theorems and prove special cases of each theorem	a, e1, e2, f, g
5. compute line and surface integrals	a
6. state and apply Fubini's Theorem, Green's, Gauss' and Stokes' Theorems, and prove some of the lemmas used in their proofs	a, e1. e2. f. g

COURSE ASSESSMENT TOOLS

1. Homework, Classwork, and Quizzes: 30%
2. Exam grade (two midterms and a final exam): 70%

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.*