

# Math 2471 – Calculus III

Semester: Summer 2023 CRN 33244

Meeting times: M-F 11:20 –12:50pm

Room: MCS 220

Instructor: Dr. Danny Arrigo

Email: [darrigo@uca.edu](mailto:darrigo@uca.edu)

Webpage: <http://www.danielarrigo.com>

Office location: MCS 201

Office telephone No. 450-5668 (not sure when I'll be there)

Office hours: M-R 2-4pm.

Textbook: Calculus – Early Transcendental 7<sup>th</sup> Ed., Person 2017

Author: Larson and Edwards or really any book. Notes will also be available throughout the course.

Calculator: TI 92, TI-92+, or Voyage 200 (could be helpful but not required)

## Introductory Remarks

This course is the last in a three-semester calculus sequence. In the first two courses, you have learned to analyze and work with quantities that vary. You developed powerful techniques for studying the rate of change of variable quantities and for determining the accumulated growth of quantities *i.e.* differentiation and integration. These two together form the language which describe most of the theories in science and engineering. It would be no overstatement to assert that without calculus, few of the technical advances of the last three centuries would have occurred. In this last course in the sequence, the ideas from Calculus I and II are extended to 3 dimensions.

## Course Description:

This course is a continuation of Calculus II and is required of all majors in mathematics, chemistry, and physics. Topics include vector valued functions, partial differentiation, multiple integrals, Green's theorem, and Stokes' theorem.

Lecture format. Prerequisite: C or better in MATH 1497. Fall, spring, summer.

## Student Learning Outcomes:

Upon successful completion of this course the student will be able to

Compute partial derivatives

- Higher order partial derivatives
- Chain rule to evaluate partial derivatives
- Directional derivatives
- Optimization

Evaluate multiple integrals

- Iterated double integrals
- Iterated triple integrals
- Change the order of integration
- Set up integral in spherical and cylindrical coordinates

Be able to

- Compute the gradient, divergence and curl of a vector field
- Formulate and evaluate line integrals
- Use Green's theorem

**Course Outline: (According to Larson and Edwards book)**

Chapter 12: Sections 1-4. *Vector Functions*. Vector functions and space curves, derivative and integral of vector functions, Tangent, Normal and Binormal vector, and motion in space.

Chapter 13: Sections 1-8. *Functions of Several Variables*. Introduction to functions of several variables, limits and continuity, partial derivatives, tangent plane, differentials, chain rule, direction derivatives and the gradient vector, min/max. values.

Chapter 14: Sections 1-7. *Multiple Integration*. Double integrals, iterated integrals, change of variables: polar coordinates, applications, triple integrals, triple integrals in cylindrical and spherical coordinates, general change of variables in integration.

Chapter 15: Sections 1-8. *Vector Analysis*. Vector Fields, line integrals, fundamental theorem for line integrals, Green's Theorem, Curl and Divergence, Parametric surfaces and their areas, surface integrals, Divergence theorem and Stokes' theorem.

**Grades**

Your grade for this course will be determined by homework, 3 tests and a cumulative final examination. Homework will be assigned after each topic and will be collected on Tuesday's and Friday's. In total, homework will be worth 10 points. There will be 3 throughout the course and they are worth 20 points each. The final exam is worth 30 points.

**Tentative test dates:**

**Tests:** June 28, July 14, and July 25. **Final:** Friday July 28, 2023

	Grade	Grade Scale
Homework:	10%	90% - 100% A
Tests:	60%	80% - 89% B
Final:	<u>30%</u>	70% - 79% C
Total	100%	60% - 69% D
		0% - 59% F.

**Attendance**

Attendance is highly recommended. If you are absent for approximately 10% without a valid excuse, where appropriate, you will be dropped from the course. It is a good idea to form small groups to work together in doing homework problems. You will learn from each other and your progress will be more rapid. However, joint work (or copying) during tests and exams is forbidden – the University has an academic dishonesty policy that you can find in the student handbook. Severe penalties apply.

### **University policy on Academic Integrity and Academic Misconduct**

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the *Student Handbook*. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

### **The Americans with Disabilities Act statement**

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Disability Resource Center, 450-3613.

### **Building Emergency Plan statement**

An Emergency Procedures Summary (EPS) for the building, in which this class is held, will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

### **The Title IX disclosure**

In furtherance of its core values— academic vitality, integrity, and diversity—UCA is dedicated to promoting a campus community free from discrimination. Title IX of the Education Amendments Act of 1972 requires all educational institutions to address gender-based discrimination on campus, and UCA implements these Federal requirements through a fair, consistent, and appropriate process of investigation and adjudication. Please see UCA's Title IX website (<https://uca.edu/titleix/>) for the university's policy, relevant forms, training opportunities, and related information.

### **Departmental Policy**

Use of cell phones (including texting), MP3 players, web browsers, ear buds/plugs is NOT ALLOWED during class time. Cell phones must be set to silent/vibrant mode while in class. Instructors may also disallow use of any other technology not relevant to the instruction. Use of any type of laptop during class time requires consent of the instructor.

### **Other Policies**

Students should familiarize themselves with all policies listed in the UCA *Student Handbook*, such as the Sexual Harassment Policy and Academic Policies.