

# NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

## **COURSE SYLLABUS**

**Course Title: Calculus III**

**Course #: MAT 268**

The course will revisit topics from a single variable calculus in the realm of three-dimensions. Topics include vector and the calculus of vector-valued functions, partial derivatives, multiple integration in rectangular, polar, cylindrical and spherical coordinates, and vector calculus. Knowledge of this subject-matter is essential for those pursuing studies in the physical sciences, engineering, mathematics or a host of other fields. Students are assumed to have a good grasp of differentiation and integration. The use of a graphing calculator is required in the course (TI-83 plus or TI-84 plus). 4 credits

**Prerequisite:** C or better in Calculus II (Mat 256).

**Goals: It is the goal of the course to:**

1. Cause the student to be an active learner.
2. Aid the student to develop increased confidence in their ability to conceptualize and perform mathematics.
3. Enhance the student's understanding of fundamental principles underlying calculus.
4. Prepare the students to apply calculus to other disciplines.
5. Inspire students to continue the study of mathematics.
6. Provide an experience wherein students enjoy learning and applying mathematics.

**Outcomes:** At the end of this course, a student should be able to:

### **Parametric and Polar Functions**

1. Graph and analyze parametric equations.
2. Find the derivative of parametric equations.
3. Convert between Cartesian and polar coordinates.
4. Graph simple polar functions.
5. Differentiate polar functions.
6. Apply integration to find the area bounded between polar graphs.

### **Vectors and Vector-Valued Functions**

1. Plot vectors in two and three dimensions.
2. Find the length and direction of a vector.
3. Find sums and differences of vectors.
4. Calculate the dot product.
5. Define a vector-valued function.
6. Find limits of, differentiate, and integrate vector-valued functions.
7. Calculate the cross product of two vectors.
8. Graph lines, planes, surfaces, curves, and vector-valued functions in space.
9. Solve applied problems.

### **Functions of Several Variables**

1. Define functions of two and three variables.
2. Find the domain of a function of several variables.
3. Sketch the graph of a function of two variables.
4. Find the limit of a function of two variables.
5. Discuss the continuity of functions of two and three variables.
6. Take partial derivatives of functions of several variables.
7. Find differentials of functions of several variables.
8. Use the chain rule and implicit partial differentiation.
9. Find directional derivatives and gradients.
10. Find equations for tangent planes and normal lines to surfaces.
11. Find extrema of functions of two variables.
12. Solve optimization problems.

### **Multiple Integration**

1. Integrate with respect to a given variable.
2. Find areas by iterated integrals.
3. Evaluate double integrals.
4. Find volumes by double integrals.
5. Find areas of polar regions.
6. Calculate mass, center of mass, and moments of inertia.
7. Use multiple integration to calculate surface area.
8. Evaluate triple iterated integrals and apply results to finding volumes, centers of mass, and moments of inertia.

### **Vector Calculus**

1. Define and sketch vector fields.
2. Find the curl and divergence of a vector field.
3. Evaluate line integrals and use the fundamental theorem of line integrals.
4. Use Green's Theorem to evaluate line integrals.
5. Define and sketch parametric surfaces.
6. Find the area of a parametric surface.
7. Evaluate surface integrals.
8. Use the Divergence Theorem to evaluate integrals.
9. Use Stokes's Theorem to evaluate integrals.

## **College Policies**

**Plagiarism:** Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanctions ranging from failure of the assignment (receiving a zero), failing the course, being removed/expelled from the program and/or the College. Please refer to your “Student Handbook” under “Policy on Student Rights,” the Section entitled “Student Discipline,” or the College catalog for additional information.

**Americans with Disabilities Act (ADA):** The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Dr. Christine Woodcock, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6318 and her email is [cwoodcock@nwcc.edu](mailto:cwoodcock@nwcc.edu).

**School Cancellations:** If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio and television stations and posted on the College’s website at [www.nwcc.edu](http://www.nwcc.edu). Students may also call the College directly at **(860) 738-6464** to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.

**Use of Electronic Devices:** Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.

**Sexual Assault and Intimate Partner Violence Resource Team:** NCCC is committed to creating a community that is safe and supportive of people of all gender and sexual identities. This pertains to the entire campus community, whether on ground or virtual, students, faculty, or staff.

Sexual assault and intimate partner violence is an affront to our national conscience, and one we cannot ignore. It is our hope that no one within our campus community will become a victim of these crimes. However, if it occurs, NCCC has created the SART Team - Sexual Assault and Intimate Partner Violence Resource Team - to meet the victim’s needs.

SART is a campus and community based team that is fully trained to provide trauma-informed compassionate service and referrals for comprehensive care. The team works in partnership with The Susan B. Anthony Project to extend services 24 hours a day, 7 days a week throughout the year.

### The NCCC team members are:

Ruth Gonzalez, Ph.D.	860-738-6315	Green Woods Hall Room 207
Susan Berg	860-738-6342	Green Woods Hall Room 223
Kathleen Chapman	860-738-6344	Green Woods Hall Room 110
Michael Emanuel	860-738-6389	Founders Hall Annex Room 308
Seth Kershner	860-738-6481	Library
Jane O’Grady	860-738-6393	Founders Hall Annex Room 212
Robin Orloski	860-738-6416	Business Office Room 201
Patricia Bouffard, Ex-Officio	860-738-6319	Founders Hall Room 103
Savannah Schmitt		Student Representative

At NCCC we care about our students, staff and faculty and their well-being. It is our intention to facilitate the resources needed to help achieve both physical and emotional health.