Warren County Community College

MAT 261 Calculus III
Course Master Syllabus

Course Information

Catalog Description: This course continues the study of MAT 201 – Calculus I and MAT 202 – Calculus II. This is the third semester of calculus. Topics include vectors, vector-valued functions, vector calculus, curves in space, functions of several variable, partial differentiation, directional derivatives, gradients, multiple integrals, line integrals, Green's Theorem, Divergence Theorem, and Stoke's Theorem. Applications will be studied throughout the course. Problems are considered from a variety of points of view, including graphical, numerical, verbal, and visual. The use of advanced graphing calculators (TI-89) is required.

Prerequisite(s): MAT 202 – Calculus II with a grade of C or HIGHER

Corequisite(s): None

Credits: 4

Hours: 4

Required Text(s): WebAssign for Larson/Edwards' Calculus, Multi-Term, 11th ed.

Supplemental Materials: Graphing Calculator (TI-89)

Instructor Information

Instructor's Name:

Contact Information:

Office Hours:

Program Goals

1. Apply mathematical and statistical concepts to solve a variety of problems, including those in science, business, and engineering.
2. Analyze and interpret quantitative data and communicate findings through verbal, numerical, and graphical models.

3. Clearly communicate mathematical concepts and solutions both verbally and in writing.
4. Use technological tools, such as graphing calculators or computers, to assist in solving mathematical and applied problems.
5. Develop the ability to understand and apply mathematical reasoning in diverse contexts, both within academia and in real-life situations.
6. Demonstrate an understanding of logical arguments and applying mathematical reasoning to draw conclusions.

Class Core Competencies

The following core competencies are embedded in this curriculum:

- Communicate effectively in both speech and writing.
- Apply appropriate mathematical and statistical concepts and operations to interpret data to solve problems.
- Use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Class Learning Assessment

Student Learning Outcomes	Suggested Means of Assessment
Apply vectors to solve problems in 3-D involving force, velocity, and work.	Homework, quizzes, tests, final exam
Apply multivariate integrals to solve problems	Homework, quizzes, tests, final exam
Sketch graphs and surfaces using cylindrical spherical, and rectangular coordinates	Homework, quizzes, tests, final exam
Calculate and apply partial derivatives to solve problems	Homework, quizzes, tests, final exam
Calculate and apply the gradient of a function to solve problems	Homework, quizzes, tests, final exam

Student Learning Outcomes	Suggested Means of Assessment
Apply theorems to solve problems, including the Fundamental Theorem of Lines, Green's Theorem, Divergence Theorem, and Stoke's Theorem	Homework, quizzes, tests, final exam
Utilize a graphing calculator effectively as a tool to solve complex mathematical problems	Homework, quizzes, tests, final exam
Demonstrate comprehension of the topics covered in this course	Homework, quizzes, tests, final exam

Grading System

Letter Grade	Percentage Range
A	90 to 100 percent
B Plus (B+)	87 to 89.9 percent
B	80 to 86.9 percent
C Plus (C+)	77 to 79.9 percent
C	70 to 76.9 percent
D	60 to 69.9 percent
F	Below 60 percent

College Information

Disability Services
Disability Services Webpage

Statement and Policy on Cheating, Plagiarism, and Academic Conduct
Academic Conduct Policy (Policy 304) [PDF]

Students are required to perform all the work specified by the instructor and are responsible for the content and integrity of all academic work submitted. A violation of academic integrity will occur if a student: (1) knowingly represents work of others as one's own, (2) uses or obtains unauthorized assistance in any academic work, (3) gives fraudulent assistance to another student, or (4) furnishes false information or other misuse of college documents.

Unauthorized use of Artificial Intelligence (AI) is prohibited unless the instructor explicitly permits it in the syllabus or assignments. If tools such as ChatGPT are permitted by an

instructor to be used for an assignment, they should be used with caution and with proper citation. In all such cases, you may only use the specific tools identified as acceptable and you must adhere to the College's standards for attribution, validation, and transparency.

In cases of suspected violation of academic integrity, the incident is to be reported to the Office of Academics. A student found guilty of violating the rule of academic integrity by the Vice President of Academics will be considered to have failed in personal obligation to the College; such failure will be subject to disciplinary action by the College. Unless otherwise notified, the instructor will allow students who are pending disciplinary action to attend class.

Tutoring and Testing at the Instructional Support Center (ISC)

- Instructional Support Center (ISC) Webpage

WCCC Library Services

- WCCC Library Website

Citation Styles and Formatting

Work submitted for any Warren County Community College course must conform to the required formatting and citation style that are specified by the instructor. The Library and Instructional Support Center can assist students with formatting and citations for assignments and papers.

WCCC Attendance Expectations

The College expects students to attend and participate in all classes. This involves sharing discussions and lectures in class, as well as interacting with other students. Grades are based on the quality of work students complete in meeting the requirements for a particular course, as stated in the course syllabus and catalog description. Attendance, among other factors, may be an additional criterion for assigning grades. Students should realize that they are responsible for all class meetings and that work missed because of absences may affect their grades. Attendance in online classes is determined by the completion of assignments/ tests. Students who have not completed any assignments or tests will be considered non-attending and receive an NF grade in online classes.

Class Attendance Expectations

Topical Outline

A. VECTORS AND THE GEOMETRY OF SPACE

1. Vectors in the plane
2. Space coordinates and vectors in space
3. The dot product of two vectors
4. The cross product of two vectors in space
5. Lines and planes in space
6. Surfaces in space
7. Cylindrical and spherical coordinates

B. VECTOR-VALUED FUNCTIONS

1. Vector-valued functions
2. Differentiation and integration of vector-valued functions
3. Velocity and acceleration
4. Tangent vectors and normal vectors
5. Arc length and curvature

C. FUNCTIONS OF SEVERAL VARIABLES

1. Introduction to functions of several variables
2. Limits and continuity
3. Partial derivatives
4. Differentials
5. Chain rules for functions of several variables
6. Directional derivatives and gradients
7. Tangent planes and normal lines
8. Extrema of Functions of Two Variables
9. Applications of Extrema of Functions of Two Variables
10. Lagrange Multipliers

D. MULTIPLE INTEGRATION

1. Iterated integrals and area in the plane
2. Double integrals and volume
3. Change of variables: polar coordinates
4. Center of mass and moments of inertia

5. Surface area
6. Triple integrals and applications
7. Triple integrals in cylindrical and spherical coordinates

E. VECTOR ANALYSIS

1. Vector fields
2. Line integrals
3. Conservative vector fields and independence of path
4. Green's Theorem
5. Parametric surfaces
6. Surface integrals
7. Divergence Theorem
8. Stokes's Theorem

Grading Methods

Assignment	Points/Percentage

Class Itinerary

Week / Unit	Topic	Readings/Assignments

Week / Unit	Topic	Readings/Assignments