Calculus with Analytic Geometry III
MTH 233-001
Spring 2025
Sugar Grove Campus, BDE 244
TTh 9:30am-11:10am

Instructor Contact Information and Availability

Name and Title:	Dr. Steve Kifowit, Assistant Professor (Pronouns: He/Him/His)
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Office Location:	Sugar Grove Campus, BDE 249
Office Hours:	MW 11:30am-12:30pm TTh 11:30am-1:00pm Other office (or Zoom) hours are available by appointment.
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Preferred Contact Method:	Email or in-person
Response Time:	During weekdays, please allow for up to 24 hours for email response.

Course Description

This third course in calculus and analytic geometry is a continuation of MTH132. Topics include vectors, vector-valued functions, space curves, multivariate functions, partial derivatives, differentials, directional derivatives, gradients, double and triple integrals, vector fields, line integrals, and the theorems of vector calculus.

Prerequisite(s)

C or better in MTH 132.

Illinois Articulation Initiative (IAI) Codes

M1 900-3, MTH 903

Course Materials

Textbook

Strang & Herman (2016). *Calculus--Volume 3*. OpenStax, ISBN: 978-1-938168-07-9

(A print copy of the textbook is not required for the class, but you must have access to the ebook, which is freely available online at https://openstax.org/details/books/calculus-volume-3*.)*

Class Materials and Resources

The TI-83/84 Graphing Calculator is required for the course.

Important Class Notes

Recommended Corequisite: None

Course Delivery Mode: Face-to-face

Credit Hours: 4.0

Course Objectives

Throughout this course, the student will learn to:

1. Perform basic operations on vectors;
2. Calculate the dot product and cross product of two vectors;
3. Write equations of lines and planes in space, including equations of tangent planes and normal lines;
4. Differentiate and integrate vector functions in two or three dimensions;
5. Apply calculus, using vectors, to study motion in space and other situations;
6. Explain the concepts of limits and continuity for functions of several variables;
7. Find partial derivatives of functions of several variables;
8. Find differentials, directional derivatives, and gradients of functions of several variables;
9. Find extrema of functions of two variables, including using Lagrange multipliers;
10. Use cylindrical and spherical coordinates to write the equations of three-dimensional figures;
11. Simplify indefinite and evaluate definite double integrals;
12. Use double integrals in applications;
13. Simplify indefinite and evaluate definite triple integrals, including using cylindrical and spherical coordinates;
14. Use triple integrals in applications;
15. Demonstrate an understanding of vector fields;
16. Find/evaluate line integrals;
17. Use Green's Theorem;
18. Use Stokes' Theorem; and
19. Use the Divergence Theorem.

Student Learning Outcomes

Course Learning Outcomes

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

1. apply partial derivatives to solve optimization problems;
2. compute double and triple integrals; and
3. apply the theorems of vector calculus to compute integrals.

College Learning Outcomes

This course contributes to the following college learning outcomes:

☒ Critical Thinking
Examine information in order to propose or develop solutions or construct arguments.

☐ Communication
Use clear language to communicate meaning appropriate to various contexts and audiences.

☐ Quantitative Literacy
Make judgments or draw appropriate conclusions based on the quantitative analysis of data.

☐ Global Awareness
Describe the interconnectedness of issues, trends or systems using diverse perspectives.

☐ Information Literacy
Use technology to ethically research, evaluate or create information.

Methods of Evaluation of Student Learning, Grading Criteria, and Scale

Your performance in this course will be evaluated based on the following components:

Grading Criteria

Total points: 500

Grading Components	Score	Quantity	Subtotal	Percent
Tests	100	3	300 points	60%
Homework Assignments	10	10	100 points	20%
Comprehensive Final Exam	100	1	100 points	20%

Grading Scale

A ≥ 89.50% B ≥ 79.50% C ≥ 69.50% D ≥ 59.50% F < 59.50%

You can estimate your current grade at any time during the semester by computing the following percentage: 100% * (Total points accumulated) / (Total points possible). Please feel free to discuss your grade at any time during the semester. Throughout the semester, current grades will be available in our Canvas course shell.

Attendance, late work, and make-up policy

Regular class attendance is an essential component of successful learning. Students are responsible for prompt attendance and participation in all class meetings. If you miss class, you will not be allowed to make up any tests, quizzes, or assignments that you may have missed (**but you may reschedule a test or submit an assignment in advance of a missed class period**). All material covered in class is the student's responsibility.

Description and Details of Assignments

Practice Problems and Reading Assignments

Practice problems from the online textbook will be suggested daily and posted to the class website. Practice problems will not be collected for grading, but they should be considered mandatory. It is important that you keep up to date with the problems. These problems will prepare you for the tests and weekly assignments. Also on a daily basis, you will be asked to read and work through certain sections of the textbook or lecture notes.

Homework Assignments

Each week, you will be given a 10-point homework assignment. The assignments will typically include 6-12 problems, several of which (but not all) will be randomly selected for grading. Homework problems will be similar to class examples and textbook practice problems. Homework assignments will be due on Thursdays, unless otherwise indicated. **Late homework will not be accepted unless the late submission is discussed and scheduled in advance with your instructor.** At the end of the semester, only your top ten (10) homework scores will count toward your overall grade.

Tests

Test problems will be similar to class examples, textbook problems, and quiz problems. In addition to computational problems, tests may include multiple choice, true/false, short answer, and/or writing problems. **You must show all work (showing how you got your answer) on all tests to receive full credit.** You must work individually on all tests. No make-up tests will be given (unless scheduled prior to the test). At the end of the semester, your lowest test score will be replaced by your final exam score (if this helps you).

Final Exam

The final exam is comprehensive and will be worth 100 points (20%) toward your final grade. **It is NOT optional.** The final exam is scheduled for our last class period, Thursday, May 15.

Calculators

The TI-83/84 graphing calculator is required for this course. There are graphing calculator emulators available for smart phones and tablets--you may you these during class periods, but not during tests. If you would like to use a graphing calculator other than the TI-83/84, please

discuss your options with your instructor. When we require more computational power than our hand-held calculators offer, we will use SageMath (https://www.sagemath.org/).

Phones/Tablets/Laptops

Electronic devices may be used for taking notes and computing during lectures, but they may not be used on in-class tests. These devices must be silenced and put away during tests. Students in special circumstances who require their phones to be readily available must discuss their situations with the instructor.

Institutional Policy

Withdrawal

Waubonsee Community College reserves the right to administratively withdraw students who are not actively attending. Students may withdraw themselves from this course until the date noted on the Tuition Refunds page.

*** Please see the Student Handbook for other course policies and procedures.

Institutional Statements

Academic Integrity

Waubonsee Community College believes that all members of the community (students, faculty, staff, and administrators) have a responsibility to participate in learning with honesty, respect, and integrity. We must commit to engage in learning both in and out of the classroom, value each member in our learning community, demonstrate original thought, and help foster ethical, open, safe learning environments for all. For more information, please see the Waubonsee Community College Plagiarism Statement section in the Student Handbook.

Accessibility and Disability Statement

Accessibility is a value of our institution. We are committed to creating environments that are welcoming and that support all students' learning. If you experience barriers to your learning in this course please notify the instructor as soon as possible to discuss options. Students who experience barriers due to disability may contact the Access Center for Disability Resources to begin this conversation or establish accommodations.

Plagiarism

Waubonsee firmly upholds sound principles of academic integrity and responsibility. Plagiarism and cheating are serious infractions of academic integrity, and, as such, are considered breaches of the Code of Student Conduct. If a student has violated this policy, I will report the infraction

to the Dean for Student Success and Retention and the student may fail the assignment or the course, depending on the severity or the number of infractions.

Student Support Services and Resources

Waubonsee Community College is committed to your success, and has many free supports, services, and resources available to you. Please visit the Waubonsee Cares page for links to basic needs (food, shelter, safety, etc.) support and resources both on campus and in the community. Please see the Student Experience page for more information and to get connected with Academic Support, Career Development, Counseling and Advising, Disability Resources, Student Life, Student Services, Technical Assistance Center, the Veterans Program, and many more! If you're not sure what type of assistance you need, please talk to me and I will help get you connected.

Course Schedule

Week (Date)	Textbook Sections	Topics & Assignments
Week 1 Jan 21 & Jan 23	Course Information, Sections 2.1, 2.2, & 2.3	Vectors in 2- and 3-space, Dot product
Week 2 Jan 28 & Jan 30	Sections 2.4, 2.5, & 2.6	Cross product, Lines and planes in space, Quadric surfaces (HW due on 1/30)
Week 3 Feb 4 & Feb 6	Sections 2.7, 3.1, & 3.2	Cylindrical and spherical coords, Vector-valued functions (HW due on 2/6)
Week 4 Feb 11 & Feb 13	Section 3.3, **Test 1 on Thursday, Feb 13**	Arc length, Test 1 covers sections 2.1-3.2. (HW due on 2/13)
Week 5 Feb 18 & Feb 20	Sections 3.3 & 3.4	Curvature, Motion in space
Week 6 Feb 25 & Feb 27	Sections 4.1, 4.2, & 4.3	Functions of several variables, Limits, Partial derivatives (HW due on 2/27)
Week 7 Mar 4 & Mar 6	Sections 4.4, 4.5, & 4.6	Tangent planes, Differentials, Directional derivatives, Gradients, Chain rule (HW due on 3/6)
Week 8 Mar 11 & Mar 13	Section 4.7, **Test 2 on Thursday, Mar 13**	Optimization w/ 2nd partials test, Test 2 covers sections 3.3-4.6. (HW due on 3/13)
Break Mar 18 & Mar 20	**Spring Break**	No classes
Week 9 Mar 25 & Mar 27	Sections 4.7 & 4.8	Optimization w/ Lagrange multipliers
Week 10 Apr 1 & Apr 3	Sections 5.1, 5.2, & 5.3	Double integrals (HW due on 4/3)
Week 11 Apr 8 & Apr 10	Sections 5.4, 5.5, & 5.6	Triple integrals (HW due on 4/10)

Week (Date)	Textbook Sections	Topics & Assignments
Week 12 Apr 15 & Apr 17	Section 5.7, **Test 3 on Thursday, Apr 17**	Change of variables, Test 3 covers sections 4.7-5.6. (HW due on 4/17)
Week 13 Apr 22 & Apr 24	Sections 6.1, 6.2, & 6.3	Vector fields, Line integrals
Week 14 Apr 29 & May 1	Sections 6.4 & 6.5	Green's theorem, Divergence and curl (HW due on 5/1)
Week 15 May 6 & May 8	Sections 6.6, 6.7, & 6.8	Stokes' theorem, Divergence theorem (HW due on 5/8)
Week 16 May 13 & May 15	Review, **Final Exam on Thursday, May 15**	Final exam is comprehensive with emphasis on course learning outcomes.

April 18 is the last day for students to withdraw themselves. Please check the current Waubonsee Academic Calendar for important dates.

Class Website

Course information, including tests, homework assignments, and answer keys, can be found on the class website at http://stevekifowit.com/classes/m233.htm.

Grades, announcements, and Zoom meeting information will be posted in our Canvas course shell. Other course information will be available on the class website.

Change of Delivery Mode

In the event that we must discontinue our face-to-face class meetings, we will automatically transition to synchronous Zoom meetings at our scheduled days and times. In such a case, Zoom meeting information will be in our Canvas Course shell. Office hours will probably transition to Zoom as well---check for announcements to be sure.