Calculus with Analytic Geometry I
MTH 131-920 (Online)
Fall 2022

Instructor Contact Information and Availability

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Response Time:	During weekdays, please allow for up to 24 hours for email response.

Course Description

This first course in calculus presents analytic geometry and the calculus of algebraic and transcendental functions including the study of limits, derivatives, differentials, and an introduction to integration. The techniques of calculus will be used to analyze functions and their graphs, solve real-world applications, develop computational and numerical methods, and analyze the relationship between differentiation and integration using the Fundamental Theorem of Calculus.

Prerequisite(s)

C or better in MTH 111 and 112; or C or better in MTH 129 (Precalculus I) and MTH 130 (Precalculus II); or C or better in MTH 130 and required placement score; or placement by appropriate measures.

Illinois Articulation Initiative (IAI) Codes

M1 900-1, MTH 901

Course Materials

Textbook

Strang & Herman (2016). *Calculus--Volume 1*. OpenStax, ISBN: 978-1-938168-02-4

Disclaimer: This course syllabus and schedule are subject to change. Updates and other revisions to course policies will be communicated via college (waubonsee.edu) email.

(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-1*.)*

Class Materials and Resources

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

Important Class Notes

Recommended Corequisite: None
Course Delivery Mode: Asynchronous online
Credit Hours: 4.0

Course Objectives

Throughout this course, the student will learn to:

1. state and use the epsilon-delta definition of the limit;
2. apply the concept of continuity, including the Intermediate Value Theorem;
3. use the definition of the derivative and interpret the derivative as both an instantaneous rate of change and as the slope of the tangent line to a function at a point;
4. differentiate functions using the rules for differentiation: power, product, quotient, and chain rules;
5. differentiate exponential, logarithmic, and trigonometric functions;
6. locate extreme values, points of inflection, and asymptotes of graphs of functions;
7. find and apply higher-order derivatives and understand how they relate to the graph of a function;
8. solve applied optimization problems;
9. use implicit differentiation and solve related rates problems;
10. apply Newton's Method;
11. apply Rolle's Theorem and the Mean Value Theorem; and
12. state and use the Fundamental Theorem of Calculus.

Student Learning Outcomes

Course Learning Outcomes

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

1. apply techniques of calculus to analyze functions and their graphs;
2. solve real-world problems using differential calculus;
3. apply the Fundamental Theorem of Calculus to analyze the relationship between differentiation and integration; and
4. attain computational facility in integral calculus.

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%
Quizzes	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.

Description and Details of Assignments

Homework

Suggested homework problems from the online textbook will be assigned daily and posted to the class website. Most of these will not be collected for grading, but they should be considered mandatory practice. It is very important that you keep up to date with the homework exercises.

Successful completion of the homework will ensure that you are learning the material, and it will prepare you for the tests and weekly quizzes.

Quizzes

Quizzes will be assigned weekly and will be worth 10 points each. The particular instructions and details pertaining to each quiz will be announced when the quiz is assigned. Quizzes may be timed or untimed. They may require paper/pencil work and submission by email, or they may require online work and submission in Canvas. Quizzes may also require collaboration with classmates by email or message board. Late quizzes will not be accepted (unless scheduled in consultation with your instructor). At the end of the semester, only your top ten (10) quizzes will count toward your overall grade. Homework problems and class examples should prepare you for the quiz problems.

Tests

Test problems will be similar to class examples, textbook problems, and quiz problems. Tests may include computational problems, as well as multiple choice, true/false, short answer, and/or writing problems. Tests may require paper/pencil work and submission by email, or they may require online work and submission in Canvas. **You must work individually on all tests.** Late tests will not be accepted (unless scheduled in consultation with your instructor). 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 toward your final grade.

Calculators

The TI-83/84 graphing calculator is required for this course. If you do not have a calculator, you can find very nice graphing calculator emulators available for smart phones and tablets. When we require more computational power than our hand-held calculators offer, we will use SageMath (https://www.sagemath.org/).

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)	Sections	Topics & Assignments
Week 1 Aug 22 - Aug 28	Course Information, Section 2.2	Intro to limits (Quiz 1 due 8/29)
Week 2 Aug 29 - Sep 4	Sections 2.2 & 2.3	Limits and limit laws (Quiz 2 due 9/5)
Week 3 Sep 6 - Sep 11	Sections 2.4 & 2.5	Continuity, Formal definition of limit (Quiz 3 due 9/12)

Week (Date)	Sections	Topics & Assignments
Week 4 Sep 12 - Sep 18	Sections 3.1 & 3.2, **Test 1 due Sep 19**	Derivatives, Test 1 covers sections 2.2-3.1
Week 5 Sep 19 - Sep 25	Sections 3.2, 3.3, & 3.4	Basic differentiation rules, Rates of change,. (Quiz 4 due 9/26)
Week 6 Sep 26 - Oct 2	Sections 3.5, 3.6, & 3.8	Derivatives of trig functions, Chain rule, Implicit differentiation (Quiz 5 due 10/3)
Week 7 Oct 3 - Oct 9	Sections 3.7, 3.8, & 3.9	Derivatives of inverse, exponential, and logarithmic functions (Quiz 6 due 10/10)
Week 8 Oct 10 - Oct 16	Catch up/Review, **Test 2 due Oct 17**	Test 2 covers sections 3.1-3.9.
Week 9 Oct 17 - Oct 23	Sections 4.1, 4.2, & 4.3	Related rates, Linearizations, Extreme values (Quiz 7 due 10/24)
Week 10 Oct 24 - Oct 30	Sections 4.4, 4.5, & 4.6	Mean Value Theorem, 1st & 2nd derivative tests, Limits at infinity (Quiz 8 due 10/31)
Week 11 Oct 31 - Nov 6	Sections 4.7, 4.8, & 4.9	Optimization, L'Hopital's rule, Newton's method (Quiz 9 due 11/7)
Week 12 Nov 7 - Nov 13	Section 4.10, **Test 3 due Nov 14**	Antiderivatives, Test 3 covers sections 4.1-4.9.
Week 13 Nov 14 - Nov 20	Sections 5.1, 5.2, & 5.3	Area, Definite integrals, Fundamental Theorem of Calculus (Quiz 10 due 11/28)
Break Nov 21 - Nov 27	**Thanksgiving Break**	No classes
Week 14 Nov 28 - Dec 4	Sections 5.3, 5.4, & 5.5	Integration formulas, Substitution (Quiz 11 due 12/5)
Week 15 Dec 5 - Dec 11	Sections 5.6 & 5.7	Integrals involving exponential, logarithmic, and inverse trig functions (Quiz 12 due 12/12)
Week 16 Dec 12 - Dec 16	Review, **Final Exam due Dec 16**	Final exam is comprehensive with emphasis on course learning outcomes.

November 11 is the last day for students to withdraw themselves. Please check the current Waubonsee Academic Calendar for important dates.

Class Website

Course information can be found in our Canvas course shell, as well as on the class website at http://stevekifowit.com/classes/m131H.htm.