Calculus III (Math 3254–002) (CRN#10559)

Spring 2024 MTWR 2:00PM–2:50PM

Professor: Dr. Jeongho Ahn
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Text: Calculus: Early Transcendentals, 9th edition by James Stewart, Cengage Learning. 2016
Prerequisites: Math 2214 (Calculus II)

Course Description: : Vectors, lines, and planes in two and three dimensions, vector-valued functions, space curves, curvature and torsion, partial and directional derivatives, extrema of functions of several variables, optimization problems, double and triple integrals with applications, cylindrical and spherical coordinates, vector fields and line integrals, Green's theorem and the divergence theorem.

Student learning outcomes for MATH 3254, Calculus III:

Students will be able to:

- Perform vector addition and subtraction, scalar multiplication, dot product, and cross product.
- Determine the equation of a line or plane given minimum information.
- Differentiate and integrate vector-valued functions.
- Determine unit tangent and normal vectors, curvature, and the tangent and normal components of acceleration for a vector-valued function.
- Understand the concepts of limits and continuity for functions of several variables.
- Use partial derivatives to find the tangent plane to a three dimensional surface.
- Use the gradient to find a directional derivative and apply.
- Find and identify the extrema for multivariable functions from real applications, both with and without constraints.
- Evaluate double and triple integrals and apply.
- Use polar, cylindrical, and spherical coordinates to ease the evaluation of double and triple integrals.
- Find the divergence and curl of a vector field and discuss their meaning.

- Evaluate line integrals both directly and via the potential function when one exists.
- Apply Green's theorem, Stoke's theorem, and the divergence theorem to convert one type of integral to another.

B.S. Mathematics and Actuarial Science program learning outcome: upon completion of the B.S. Mathematics and Actuarial Science program, students will be able to

- demonstrate the ability to think analytically to decipher challenging problems, utilize appropriate mathematical practices to construct mathematical arguments to solve them, and interpret their solutions.
- demonstrate the ability to construct logical arguments and write formal mathematical proofs to establish the truth of mathematical statements.
- demonstrate the ability to communicate mathematics effectively.

MATH 3254, Calculus III, is linked to the following student learning outcomes for the B.S. Mathematics/B.S.E. Mathematics degree programs:

- Having a command of ideas and techniques ranging across single and multivariable calculus, discrete mathematics, linear algebra, statistics, and differential equations. These topics stand at the gateway to powerful and deep mathematics and provide the foundation for more advanced study of mathematics and the breadth necessary to apply mathematics flexibly.
- Being able to think analytically and critically, formulate problems, solve them, interpret their solutions, and frame generalizations.
- Communicating mathematics with clarity and effective exposition.
- Being able to apply knowledge from mathematics to other disciplines. This includes students having practice translating problems from other disciplines into mathematics and then expressing the solution in language understandable to those with relatively little mathematical training.
- Effectively demonstrating and applying knowledge of major mathematics concepts, algorithms, procedures, connections, and applications within and among mathematical content domains.
- Effectively solving problems, representing mathematical ideas, reasoning, proving, using mathematical models, attending to precision, identifying elements of structure, generalizing, engaging in mathematical communication, and making connections as essential mathematical practices; understanding that these practices intersect with mathematical content and that understanding relies on the ability to demonstrate these practices within and among mathematical domains and in their teaching.

Grading

- Quizzes:10% In-class tests:60% Final exam:30%
- Grades are assigned on the following basis:

	A	B	C	D	F
From	90	80	70	60	0
To	100	89	79	69	59

Homework

- It is expected that you will complete each homework. We note that diligent completion of homework is essential to successful completion of this course. So you should plan on spending **at least one or two hours** of work outside of class for everyday class to be successful.

Tests & Final Exam

- You will take three in-class tests. You will see the dates for each test in assignment sheets.
- The final exam is comprehensive and may include all materials covered during the semester.
- **The final exam Schedule: May 1 (Wed), 2:45PM–4:45PM**

Last Day to Drop by web: April 5 (Fri)

Class Policies

1. Attendance: As stated in the student handbook, "Students should attend every lecture, recitation, and laboratory session of every course in which they are enrolled." Students who have more than **eight unexcused absences** or **four consecutive unexcused absences** will be assigned an "F" for this course. When possible, you should give advanced notice of absences. When you miss more than **seven** classes, you must come to see me.
2. Calculators: You should have a graphing calculator TI-83 for this course. The purpose of using a calculator is to help you better understand examples for a large portion of the material and check your answers.
3. Academic Dishonesty: When you take a test, you are not allowed to communicate in any fashion with anyone except myself. In addition, you are not allowed to view another student's work, share paper or calculators.

4. Demeanor:
   (1) If you distract other students from studying during class, you will be asked to leave class. If it is the second time, you will be administratively dropped.
   (2) **Please turn your cellular phone off before you come to class.**
   (3) **When you take all the quizzes or the tests, you are neither allowed to use your phone nor go to a bathroom.**

5. Make-ups: **There is no make-up of quizzes. But you are allowed to take a make–up of tests and the final, if I am notified in advance.**

Additional Notes

- The course plan may be modified during the semester. Such modifications will be announced during class periods; the students have responsibility for keeping up with such changes.
- Students who require academic adjustments in the classroom due to a disability must first register with ASU Access & accommodation services. Following registration and within the first two weeks of class, please contact me to discuss appropriate academic accommodations. Appropriate arrangements can be made to ensure equal access to this course.

Title IX (Sexual Harassment Discrimination)

- Visit the ASU website: https://www.astate.edu/a/affirmative-action/title-ix/

Dr. Jeongho Ahn's Schedule for Spring 2024

	Monday	Tuesday	Wednesday	Thursday	Friday
11:00	Office Hours				Office Hours
12:00	Diff. Eqs Math 4403 CSM 131		Diff. Eqs Math 4403 CSM 131		Diff. Eqs Math 4403 CSM 131
1:00			Office Hours		
2:00	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	Cal III Math 3254 HSS 2063	
3:30 −4:45		Intro. to N. A. Math 4533 CSM 209		Intro. to N. A. Math 4533 CSM 209	

If the above office hours conflict with your schedule, please email me to arrange a meeting time.