

## Calculus III Math 158-01, Fall 2025 Course Syllabus and Outline

Instructor: Dr. Senhuei Chen

Office: Academic Support Building B (ASB) Room 218

Telephone: Office 202 806 6834 or Math Department 202 806 6830

Email: [empty57quarter@yahoo.com](mailto:empty57quarter@yahoo.com) (checked often); [schen@howard.edu](mailto:schen@howard.edu)

Office Hours: MWF 9:10 am to 10:00 am and by appointment (virtually any time)

email [empty57quarter@yahoo.com](mailto:empty57quarter@yahoo.com) to schedule an appointment via

Google Meet: <https://meet.google.com/vuv-ompe-fxn>

Course website: <https://5f216d8247491.site123.me/>

Meeting time: 10:10 am to 11:00 am, MWRF, Room: **ASB-B 213/215 or ASB-B 103**

**"It is trite but true that Mathematics is learned by doing it, not by watching other people do it."  
From Introduction of the book "Methods of Modern Mathematical Physics I: Functional  
Analysis" by Michael Reed and Barry Simon.**

### COVID-19 STATEMENT:

**The wearing of a face mask in the classroom is mandatory. Students will be directed to leave the classroom if a face mask is not worn properly to cover the nose and mouth. Any student who refuses or fails to comply with the University's requirements and precautions against COVID-19, and any other measures the University advances for the safety and protection of the Howard Community, will constitute a violation of the University's Student Code of Conduct and could result in sanctions up to and including expulsion from the University**

Academic Code of Student Conduct (refer to Howard University handbook): No Copying, unauthorized use of calculators, books, or other materials, or changing answers or other academic dishonesty will be tolerated

**It is your responsibility to learn. I expect you to take the initiative to succeed in this class. That means doing your homework, studying the textbook, asking questions in class and asking questions outside the class.**

REQUIRED TEXT: Calculus, Early Transcendental, 9<sup>th</sup> Edition, by Stewart

Grading scheme: A: 90-100 B: 80-89 C: 70-79 D: 60-69 F:<60

**6 tests (5 tests during semester, final exam), 18 points each, worst one to drop**

**Homework, 10 points. All together add up to 100.**

Suggested practices from the textbook:

12.1: 5, 6, 7, 8, 9, 10, 14~42, 48, 49  
12.2: 6, 8, 9~14, 19~26, 43, 47, 48  
12.3: 2~13, 15~20, 23, 24, 27, 39~44, 54, 58, 61, 62  
12.4: 1~7, 9~13, 17~22, 43, 44, 47  
12.5: 2~14, 16, 19, 20, 23~48, 51~56, 57(a), 58(a), 61~68  
12 Review: 1, 3, 5, 6, 9, 15~21, 24(a), 26(a)

13.1: none  
13.2: 9~14, 17~28, 55,  
13.3: 3~8, 19~29, 31, 32, 33, 51, 52  
13 Review: 8, 9, 11, 12, 13

14.1: none  
14.2: none  
14.3: 9~64, 76, 77, 78, 79, 80, 81, 83, 84, 85, 91  
14.4: 3~10, 27  
14.5: 3~16, 25~38, 49~55  
14.6: 8~25, 27~32, 47~52, 57, 58, 59, 67, 72  
14.7: 5~22, 43~47, 52  
14.8: 3~16, 39, 40  
14 Review: 13~17, 19~29, 31, 32, 33, 35, 39, 41, 42, 43, 45, 46, 47, 59~62

15.1: 9, 10, 11, 13~34, 43~47  
15.2: 1~14, 19~28, 31~35, 55~68  
15.3: 1~22, 25~37, 39~42  
15.4: 5~12  
15.5: 3~14  
15.6: 3~8, 13, 14, 16, 19, 20, 23  
15.7: none  
15.8: 23~29  
15.9: 11~21  
15 Review: 3~8, 19~40

16.1: none  
16.2: 1~18, 21~24, 41, 42, 43  
16.3: 3~10, 16~26  
16.4: 1~18  
16.5: 1~8, 32, 33, 34  
16.6: 1, 2, 19~23, 25, 26, 33~36, 39~50  
16.7: 6~13, 16, 17, 20, 24, 25, 26, 28, 29, 32  
16.8: 2~14, 18, 19  
16.9: 1~17, 25, 26  
16 Review: True-False Quiz, 2~10, 13~18, 22, 27~36, 38

Topics to be covered    vectors, operations of vectors, geometric meaning of vectors, dot and cross products,    equations of lines in 3-space, equations of planes in 3-space; vector-valued functions, change    of parameters, arc length, unit tangent, normal, and binormal vectors; partial derivatives, chain rules,    directional derivatives, gradients, maximum and minimum, Lagrange multipliers; double integrals,    double integrals over non-rectangular coordinates, surface integrals, triple integrals,

spherical and cylindrical coordinates, Jacobians, line integrals, conservative fields, Green's Theorem, Divergence Theorem, Stokes' Theorem

**Course Content:**

**CHAPTER 12: VECTORS AND THE GEOMETRY OF SPACE.**

Section 12.1: Three-Dimensional Coordinate Systems.

Section 12.2: Vectors.

Section 12.3: The Dot Product.

Section 12.4: The Cross Product

Section 12.5: Equations of Lines and Planes.

Section 12.6: Cylinders and Quadric Surfaces.

**CHAPTER 13: VECTOR FUNCTIONS.**

Section 13.1: Vector Functions and Space Curves.

Section 13.2: Derivatives and Integrals of Vector Functions.

Section 13.3: Arc Length and Curvature.

Section 13.4: Motion in Space: Velocity and Acceleration.

**CHAPTER 14: PARTIAL DERIVATIVES.**

Section 14.1: Functions of Several Variables.

Section 14.2: Limits and Continuity.

Section 14.3: Partial Derivatives.

Section 14.4: Tangent Planes and Differentials.

Section 14.5: The Chain Rule.

Section 14.6: Directional Derivatives and the Gradient Vector.

Section 14.7: Maximum and Minimum Values.

Section 14.8: Lagrange Multipliers.

**CHAPTER 15: MULTIPLE INTEGRALS.**

Section 15.1: Double Integrals over Rectangles.

Section 15.2: Double Integrals over General Regions.

Section 15.3: Double Integrals in Polar Coordinates.

Section 15.4: Applications of Double Integrals.

Section 15.5: Surface Area.

Section 15.6: Triple Integrals.

Section 15.7: Triple Integrals in Cylindrical Coordinates.

Section 15.8: Triple Integrals in Spherical Coordinates.

Section 15.9: Change of Variables in Multiple Integrals.

**CHAPTER 16: VECTOR CALCULUS.**

Section 16.1: Vector Fields.

Section 16.2: Line Integrals.

Section 16.3: The Fundamental Theorem for Line Integrals.

Section 16.4: Green's Theorem.

Section 16.5: Curl and Divergence.

Section 16.6: Parametric Surfaces and Their Areas.

Section 16.7: Surface Integrals.

Section 16.8: Stokes' Theorem.

Section 16.9: The Divergence Theorem.

Section 16.10: Summary.

**CLASSROOM POLICIES:**

1. **No cell phone or computer usage during class, including texting.** Please turn your ringer off before the start of class and keep your laptop closed.
2. Research has shown that students who regularly attend class tend to do better than those who do not. Please be on time.
3. No calculator allowed while taking tests.

**Homework:** Homework is an absolutely essential educational part of the course. You cannot work problems on exams if you have not practiced the techniques and become comfortable applying the concepts within the homework problems. If you misuse homework by not doing it yourself, or not checking that you can solve a problem on your own after having been shown how to do it, then your exam scores and corresponding grade will reflect this. Trust me on this last point. Some additional points:

- You are strongly encouraged to collaborate in the analysis and study stage of homework preparation. However, you are required to completely write your own original work.
- You will be graded on your PROCESS in work construction rather than simply your ability to calculate. You must present your work solutions as if they are complete educational tools for study. In essence, you must PRESENT your solution and not simply answer questions.

**Course Policy:** You are responsible for lecture notes, any course material handed out, and attendance in class. While I will not formally record your attendance, I will get to know you and your rate of presence over time. ***The lectures will be conducted as if you have already read the material and attempted some homework problems.*** In this manner, you can focus mainly on those parts of the lectures that cover the areas of your reading you found difficult to understand. My teaching style is that of interactive discussion and I will rely on your input in developing the material. Active participation in the classroom is a great way to generate the discussion necessary to fully grasp the material.

**Ethics Statement:** The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Cheating is wrong. Cheating hurts our community by undermining academic integrity, creating mistrust, and fostering unfair competition. The university will punish cheaters with failure on an assignment, failure in a course, permanent transcript notation, suspension, and/or expulsion. Offenses may be reported to medical, law, or other professional or graduate schools when a cheater applies.

Violations can include cheating on exams, plagiarism, reuse of assignments without permission, improper use of the Internet and electronic devices unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Ignorance of these rules is not an excuse.

In this course, as in many math courses, working in groups to study particular problems and discuss theory is strongly encouraged. Your ability to talk mathematics is of particular importance to your general understanding of mathematics.

You should collaborate with other students in this course on the general construction of homework assignment problems. However, you must write up the solutions to these homework problems individually and separately. If there is any question as to what this statement means, please see the professor.