

Calculus I – Differential Calculus MA1021 – Section AL08 (group 8)

Fall 2022 – A Term

Professor

Jon Abraham jabraham@wpi.edu SL 405C

Graduate Learning Assistants / Peer Learning Assistants

AD08 Thurs 9:00 SH 106 PLA: Nick Healy njhealy@wpi.edu

AD12 Thurs 12:00 SH 106 PLA: Ben Gobler blgobler@wpi.edu

AD09 Thurs 10:00 SH 106
AD13 Thurs 8:00 SH 106 } GLA: Mandeep Singh msingh2@wpi.edu

Course Objectives:

At the conclusion of this course, students will be able to:

1. State the domain and range of a function and be able to quickly sketch a reasonable depiction of the graph of the function.
2. Evaluate the limit(s) of a function as the input approaches a given value.
3. Explain what continuity is and identify its presence or absence in a given function and interval.
4. State the definition of the derivative. Use the definition to compute the derivative of a given function. Use knowledge of what a derivative represents to describe and explain the behavior of a function, including finding maximum and minimum values.
5. Understand when linear approximation can reasonably be applied, and use this technique to estimate function values that would otherwise be computationally difficult.
6. Learn a variety of differentiation techniques (build your toolbox).
7. Identify which differentiation technique should be used to solve a variety of given functions (know which tool to use).
8. Read and interpret word problems which will require identifying the specific question being asked, deciding which information should be used to solve the problem, generating the applicable function(s), and deciding which techniques or approaches should be used.
9. Pass a Basic Skills test administered by the Mathematics Department

Textbook:

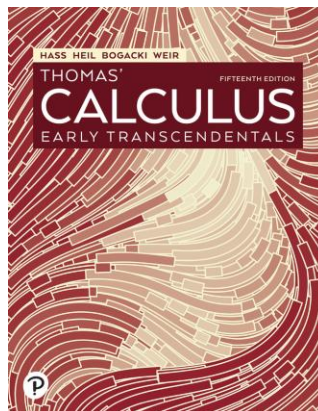
Thomas' Calculus (15th edition)

Hass, Heil, Bogacki, Weir

Early Transcendentals

ISBN 978-0-13-756015-8

(Note: You can use the hardback, loose-leaf, or electronic version – the WPI bookstore has the latter two versions available, at reasonable prices.)



<u>Grading:</u>	Computer lab	6%
	Textbook homework	12%
	WeBWorK	12%
	Midterm 1 September 16 in class	20%
	Midterm 2 October 7 in class	20%
	Final Exam (cumulative) October 12, 7:15 pm	30%
	Total	100%

Grades will be assigned as either A, B, C, I, or NR

- An average of 90% will ensure an A for the course.
- An average of 80% will ensure a B for the course.
- An average of 70% will ensure a C for the course.

Academic Accommodations Statement

Students with approved academic accommodations should plan to submit their accommodation letters through the Office of Accessibility Services Student Portal. Should you have any questions about how accommodations can be implemented in this particular course, please contact me as soon as possible. Students who are not currently registered with the Office of Accessibility Services (OAS) but who would like to find out more information regarding requesting accommodations and what that entails should plan to contact them: Email: AccessibilityServices@wpi.edu or via phone: (508) 831-4908.

Academic Honesty

There is no place for cheating in a university. As future leaders of our society, WPI students will be held to the highest ethical standards. Hard-working honest students can be assured that I will do my best to preserve the integrity of their good work by being vigilant and promptly and forcefully prosecuting cases of academic dishonesty. Each student should be familiar with WPI's Academic Honesty Policy (<http://www.wpi.edu/Pubs/Policies/Honesty/policy.html>). If you are ever unsure as to whether or not your intended actions are considered academically honest, please see me.

Conference Meetings

Your graduate learning assistant (GLA) or peer learning assistants (PLA) will hold weekly conference sessions. Students will be able to ask their GLA/PLA questions on the material covered in lectures, and on homework. The GLA/PLA may also give in-class assignments and review course material.

Textbook Homework:

In order to encourage students to keep up with the course and to prepare for the tests, a significant number of problems from the text will be assigned each week. These will be graded for credit. Textbook homework is due every Thursday beginning September 1, at midnight. Your work should be neat and complete – and you will need to scan it to a PDF and upload it to Canvas by the due date/time. **Late work will be accepted, but marked down 10% per day late.**

WeBWorK:

WeBWorK is an online homework site, accessed via Canvas. You will have multiple WeBWorK assignments each week, which will be due on Tuesday nights at midnight (with the exception of one final assignment which will be due on the last day of class). There is no “submission” for WeBWorK; as you solve problems on the WeBWorK site, that is automatically captured. **Late WeBWorK will not be accepted.**

Exams & quizzes:

Tests, quizzes, and the Final are closed-book, no notes, no calculators.

Material to be covered:

The course content is prescribed by the Department of Mathematical Sciences.

http://www.math.wpi.edu/Course_Materials/CALC_GEN/thomas_syllabus.html

1. Functions, operations on functions, transcendental functions (1.1-1.6) ◀ review
2. Limit Concepts (2.1, 2.2)
3. Rigorous definitions, one-sided limits (2.3, 2.4)
4. Continuity (2.5)
5. Limits involving infinity (2.6)
6. Introduction to the derivative (3.1-3.4)
7. Derivatives of trig functions (3.5)
8. Chain rule (3.6)
9. Implicit Differentiation (3.7)
10. Derivatives of inverse functions: logs and inverse trig functions (3.8, 3.9)
11. Related rates (3.10)
12. Differentials and linear approximation (3.11)
13. Extreme values (4.1)
14. Mean value theorem (4.2)
15. First and second derivative tests, concavity, curve sketching (4.3-4.4)
16. Applied optimization (4.6)
17. Newton's Method (4.7)