Worcester Polytechnic Institute

MA 1022 Calculus II
Mathematics Department
WPI C Term 2025

Professor:
Teaching Professor Michael R. Johnson, PhD
Email: mrjohn@wpi.edu
Phone: 508-831-5134
Office location: Stratton Hall, SH 421 (or SH 431 conference room)
Available for office hours in person MRF 2-3pm, T 3-4pm

Textbook (and/or other Required Materials):
Text: Calculus Volume II, 2016; Gilbert Strang and Edwin "Jed" Herman;
OpenStax, **ISBN**-13: 978-1938168062

Buying your book
You can purchase the book at a very affordable price ($40 or less) at the bookstore.
You may also access the text for free online through the OpenStax website.
https://openstax.org/details/books/calculus-volume-2

Course software:
- **Webwork -** find links on Canvas page under Assignments
- **Desmos** - used for labs and in class.

Course Description:
Chapter V1 4.10 and 1: Basics of Integration (9 classes)
Chapter 3: Techniques of Integration (9 classes)
Chapter 2: Applications of the Integral (9 classes)

This course builds and applies integral calculus. We illustrate the concept of integration through Riemann sums and the fundamental theorem of Calculus. Make use of acceleration and velocity to determine displacement. Integration techniques applied include substitution, by parts, partial factions, and utilization of trigonometric identities. Integration techniques also address inverse trigonometric, logarithmic and exponential functions.

Applications constructed and solved for include area, volume by rotating disks, arc length, surfaces by revolving arcs, and center of mass. Exponential growth and decay models are utilized.

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Learning Outcomes:

- Identify the inverse relationship between derivatives and integrals and connect to previous Calculus background. Use an integration table effectively and recognize appropriate substitutions.
- Apply summations to estimate area using numerical optimization techniques.
- Extending integration to applications that determine area, arc lengths of curves, and volumes and surfaces of three-dimensional objects.
- Use separable differential equations for exponential growth and decay in physical models.
- Effectively classify integration techniques and apply them to find solutions.

PLA/GLA/TAs:

PLA – Undergraduate Peer Learning Assistant

PLA Felipe Teixeira **(**ffteixeira@wpi.edu**)**	MA 1022 AD01 T 8 -8:50am SH 313
	MA 1022 AD02 T 9-9:50am SH 313
PLA TBA	MA 1022 AD05 T 11-11:50am SH 301

- *Felipe will be leading discussions and supporting the course.*

PLA Aidan Cook (ajcook@wpi.edu) (PLA-GO)

- *Aidan will be holding office hours and grading.*

Please use my office hours, appointments with the PLAs, the ARC - which includes one-on-one tutoring appointments through tutortrac, and our MTC (Math Tutoring Center) in SH 206.

Math Tutoring Center:

Please make use of the Math Tutoring Center at Stratton Hall SH 206.
This is walk-in tutoring and hours are M-R 11-5pm and F 10-2pm. No appointments necessary.

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ARC:

The Academic Resources Center (ARC) offers individual tutoring and Math and Science Help (MASH, group drop-in tutoring) in person on the 5th floor of Unity Hall for undergraduate students. Some MASH sessions that occur after 6pm may take place in the Exam Proctoring Center (EPC, UH 505). Tutoring sessions are 50 minutes long and are facilitated by peer undergraduate students. Tutoring availability is dependent on tutor's schedules within the ARC hours of operation. Students should use Tutortrac to sign up for 1-on-1 tutoring appointments that fit their schedule. Students are encouraged to schedule 1-on-1 appointments in advance. No appointments are needed for MASH group drop-in sessions.

C Term 2025 Tutoring will begin on Friday January 17, 2025 and will end on Wednesday March 5, 2025. **There will be no tutoring in C term 2025 on:** January 20, 2025; February 14, 2025; February 27, 2025. Information about MASH and tutoring offered by the ARC is located on the Academic Resources Center Canvas Page and on the Academic Resources Center WPI Webpage.

Course Details:

- **Lecture** MTRF 12-12:50pm in Salibury Labs 115 (Kinnicutt Hall)
- **Labs** W 9am-12pm or 4pm CX01-CX05
- **Discussion** Section AD06: T, 8am or 9am (SH 313)
  Section AD10: T, 11am (SH 301)
- View Assignments, Modules, and keep up to date with Announcements through Canvas.
- Lecture capture records classes so you can follow a video of the class through if you have missed for any reason. Class notes are also provided under Modules.
  Please use this as a complement rather than a substitute (showing up to class is still very important!)
- Homework assignments given weekly except for exam weeks or class following an exam.
- A basic skills exam is a condition to pass the course. See details below.

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Course Requirements:

1. **Assignments**
2. **Late Work Policy**
   I accept late work but at a 10% daily deduction. This will be allowed until solutions are posted for the assignment (before exams solutions are posted sooner than later). Please start assignments early and communicate with me to discuss questions. Feel free to talk if you encounter difficult circumstances.
3. **Class Participation Expectations and Criteria**
   A discussion board is used in Canvas to facilitate conversation and ideas. Assignments may tie into the discussion board for brainstorming with fellow students.
4. **Grade Determination Breakdown**
   A 90-100, B and C.
   A score greater than 80 earns at least a B and above 70 is at least a C. Scaling can occur depending on the difficulty of exams. A passing grade (C) will scale no lower than a 65.

Three Exams	65%	Test 1: R, 1/30 (9) Chapters 4.10, 1.1-1.6 (15-25%) Test 2: R, 2/20 (20) Chapters 1.5, 2.1, 3 (15-25%) Test 3: F, 3/7 (28) Chapter 2
Basic Skills	5%	First Try T, 2/18, Retake T, 2/25 at 4pm, Retake II F, 2/28 at 4pm ○ 100 – 7 correct, 95 – 6 correct, or 90 – 5 correct. ○ Retake I: 90-7, 85-6, 80-5. ○ Retake II: 80-7, 75-6, 70-5.
Quizzes	5%	Discussions T, 1/21, T, 2/11, and T, 2/25

Homework & Webwork **15%**

Mostly Tuesday and Fridays – with two exceptions R, 2/13 and W, 3/5.

- One HW or WW grade will be dropped in average calculation.

Labs **10%**

Lab #1: Due W, 1/29 Approximation of Area using Rectangles -Maple
Lab #2: Due W, 2/12 Volumes of Revolution Bell Pitch - Maple
Lab #3: Due W, 2/26 Center of Mass – Desmos

If you cannot complete a homework assignment on the dates listed, please inform me beforehand. I am flexible about emergencies or illness if you inform me early.

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Basic Skills Exam Dates

1) T, 2/18 Basic Skills 12-12:50pm during class 19. (100-95-90 if pass)
* You must let your professor know beforehand if you cannot make this time.
Also e-mail Prof. Johnson (mrjohn@wpi.edu).
2) T, 2/25 Retake I 4pm (if needed) * (90-85-80 if pass)
3) F, 2/28 Retake II 4pm (if needed) * (80-75-70 if pass)

* You must let your professor know beforehand if you cannot make this time.
Also e-mail Prof. Johnson (mrjohn@wpi.edu).
* More basic skills attempts offered at the start of D-term if needed.
Your score from the failed basic exam score is factored in the final average.

Basic Skills Details

- A basic skills component must be passed to pass the course. To pass the basic skills exam you need to correctly answer at least five of the seven questions. Retakes are offered if you do not pass initially.
- Sections covering integration techniques from V1 4.10, 1.5-1.7, 3.1-3.2, and 3.4 will be on the basic skills exam.

POLICIES

Academic Integrity:

See school's policy: *www.wpi.edu/offices/policies/honesty/studentguide.html*
Working together is permissible except during exams. When working together you must show individual thought and writing in each problem assigned. Direct copying (and allowing someone to copy directly from you) is not acceptable.

Consequences for violating the Academic Honesty Policy range from earning a zero on the assignment, failing the course, or being suspended or expulsion from WPI. The Dean of Students Office maintains judicial records for any act of academic dishonesty.

Common examples of violations include:

- Paraphrasing, summarizing, or rephrasing from a source without appropriate citations.
- Turning in work where a good portion is someone else's, even if properly cited.

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Academic Accommodations:

We strive to create an inclusive environment where all students are valued members of the class community. If you need course adaptations or accommodation, or if you have medical needs that may impact on your performance or participation in this course, please make an appointment with us as soon as possible. If you have approved accommodation, please request your accommodation letters online through the Office of Accessibility Services student portal. If you have not already done so, students with needs who plan to utilize accommodation for this course are encouraged to contact the Office of Accessibility Services as soon as possible to ensure that such accommodations are implemented in a timely fashion.

Email – AccessabilityServices@wpi.edu
Phone – (508) 831-4908
On Campus – Unity Hall 5th Floor

Please know it is important to me that you feel you are in the best position to succeed in the course. If you need accommodation and there is anything I can do to help, I will be happy to assist to the best of my abilities.

Expectations and Behavior:

Cell phones and distracting electronic devices are to be turned off and out of sight unless used for classroom work. No texting during class. Computer use only related to class is acceptable. Reasons for missing exams, labs, or discussions need to be discussed beforehand with the professor or TA/PLA/GLA.

Let me know of personal or academic difficulties you are experiencing.

- Personal struggles are referred to WPI Student Development and Counseling Office (SDCC). It is a great resource designed to help. SDCC is located at 16 Einhorn Road and can be contacted through sdcc@wpi.edu and x-5540.
- The OAS (Office of Accessibility Services) corresponds accommodation and helps with testing strategies to improve student performance. They help with anxiety and other issues.

Artificial Intelligence

It is a violation of WPI policy to misrepresent work that you submit or exchange with your instructor by characterizing it as your own, such as submitting responses to assignments that do not acknowledge the use of generative AI tools. Please feel free to reach out to me with any questions you may have about the use of generative AI tools before submitting any content that has been substantially informed by these tools.

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Class Schedule		Topics
Class 1	W, 1/15	V1 4.10 Antiderivatives
Class 2	R, 1/16	1.1 Approximating Areas
Class 3	F, 1/17	1.2 The Definite Integral
Class 4	T, 1/21	1.3 The Fundamental Theorem of Calculus
Class 5	R, 1/23	1.4 Integration Formulas and the Net Change Theorem
Class 6	F, 1/24	1.5 Substitution
Class 7	M, 1/27	1.5 Substitution in Definite Integrals & 1.6 Integrals Involving Exponential and Logarithmic Functions
Class 8	T, 1/28	1.7 Inverse Trigonometric Functions (not on Test 1)
-----	Test 1 Material Class 1-7 ----------	
Class 9	R, 1/30	Test 1: V1 4.10, V2 1.1-1.5
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Class 10	F, 1/31	3.1 Integration by Parts
Class 11	M, 2/3	3.1 Integration by Parts
Class 12	T, 2/4	3.2 Trigonometric Integrals
Class 13	R, 2/6	3.2 Trigonometric Integrals
Class 14	F, 2/7	3.4 Partial Fractions
Class 15	M, 2/10	3.4 Partial Fractions
Class 16	T, 2/11	3.6 Numerical Integration
Class 17	R, 2/13	2.1 Area for Plane Region
Class 18	M, 2/17	2.2 Volumes using Disks & Washers
------	Basic Skills 1 Material Class V1 4.10, 1.5-1.7, 3.1-2, 3.4----------	
Class 19,	T, 2/18	Basic Skills Exam (Retakes T, 2/25 and F, 2/28)*
-------	Test 2 Material Classes 7-8, 10-17 ----------	
Class 20,	R, 2/20	Test 2: V2 1.6-1.7, 2.1, 3.1-3.4, 3.6
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Class 21,	F, 2/21	2.4 Arc Length and Surfaces of Revolution
Class 22,	M, 2/24	2.7 Natural Logarithm as an Integral
Class 23,	T, 2/25	2.8 Exponential Growth and Decay
Class 24,	F, 2/28	2.8 Exponential Growth and Decay
Class 25	M, 3/3	2.5 Physical Applications Centers of Mass
Class 26	T, 3/4	2.6 Moments and Center of Mass
Class 27	R, 3/6	Review for Test 3
------	Test 3 Material Class 19-26 ----------	
Class 28	F, 3/7	Test 3: V2 V2 2.1-2.2, 2.4-2.8

* Basic Skills Retake I will be offered on T, 2/25 at 4pm and Basic Skills Retake II will be offered on F, 2/28 at 4pm. If you have a time conflict let me know the week beforehand if you do not pass the first exam.