Worcester Polytechnic Institute

MA 1022 Calculus II
Mathematics Department
WPI A Term 2024

Professor:

Teaching Professor Michael R. Johnson, PhD
Email: mrjohn@wpi.edu
Phone: 508-831-5134
Office location: Stratton Hall, SH 421
Available for office hours in person and online MRF 8:30-9:30am, T 2:30-3:30pm
I'll be regularly available right after class as well.

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: Building 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.

Prerequisite Courses, Placement and Retroactive Credit:

Calculus I is required. References to differential calculus are made in this course. Freshmen access the math placement exam to automate the recommended level of Calculus to start at WPI. It measures your ability based on your high school experience. No study was expected prior to taking the exam. You should not have used notes or a calculator either. In most cases, take that recommendation.

Worcester Polytechnic Institute

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.

Office Hours:

MTRF 8:30-9:30am in-person and online. By appointment also.
I will also have Zoom meeting links available on Canvas for office hours.

PLA/GLA/TAs:

PLA – Undergraduate Peer Learning Assistant
PLA Felipe Teixeira **(**ffteixeira@wpi.edu**)** MA 1022 AD06 W 11 -11:50am
MA 1022 AD10 W 12-12:50pm

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

PLA Veronica Crispin (vbcrispin@wpi.edu) (PLA-GO)

- *Veronica will be holding office hours, grading and answering e-mail questions.*

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.

Worcester Polytechnic Institute

ARC:

Both individual peer tutoring and Math and Science Help (MASH, group tutoring) will be offered in person in the Academic Resources Center (ARC), located on the 5th floor of Unity Hall. 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 is available between the hours of 10:00am-9:00pm Mondays through Thursdays, 10:00am-5:00pm on Fridays, and 12:00pm-9:00pm on Sundays. Students should use tutortrac.wpi.edu to sign up for individual tutoring appointments that fit their schedule.

No appointments are needed for MASH group sessions. If a student has a scheduling conflict, they can submit an ARC Tutoring Inquiry Form (Bit.ly/ARCTutor) to seek an appointment that aligns with their schedule. Students should only submit this form if all available tutoring slots do not work with their schedule. While we will work to accommodate an alternative tutoring time, alternative availability is not guaranteed.

A-Term 2024 MASH and tutoring will begin on Sunday August 25, 2024 and end on Wednesday October 9, 2024. Further information about MASH and tutoring offered by the ARC are located on the Academic Resources Center Canvas Page and on the Academic Resources Center WPI Webpage.

Course Details:

- **Lecture** MTRF 10-10:50am in Unity Hall 420
- **Labs** M or R Section CX01-CX05: M 8am to 12pm
  -or- Section CX06-CX10: R 12pm to 4pm
- **Discussion** Section AD06: W, 11-11:50am (SH 313)
  Section AD10: W, 12-12:50am (SH 313)
- 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.

Worcester Polytechnic Institute

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. 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.

Two Exams	40%	Test 1: F, 9/6 (9) Chapters 4.10, 1.1-1.6 (20%) Test 2: R, 9/26 (20) Chapters 1.5, 2.1, 3 (20%)
Basic Skills	5%	First Try T, 9/24, Retake I T, 10/1, Retake II F, 10/4 ○ 100 – 7 correct, 85 – 6 correct, or 70 – 5 correct. ○ Pass retake – 70.
Quizzes	5%	Discussions W, 8/28, W, 9/18, and W, 10/2
Final	25%	Comprehensive Final: R, 10/10 (28) 5-7pm - Final will have 50% of its questions from 2.2-2.8 (except 2.5). The other 50% is a mix of Chapter 1 and 3 questions.
Exams Total	**75%**	

Homework & Webwork **15%**
Most every Tuesday and Friday – except exam weeks.
Labs **10%**
Lab #1: Due W, 9/4 Riemann Sum
Lab #2: Due W, 9/18 Actuarial Science
Lab #3: Due W, 10/2 Solids of Revolution
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.

Basic Skills Exam Dates

1) T, 9/24 Basic Skills 6-7pm
* You must let your professor know beforehand if you cannot make this time.
Also e-mail Prof. Johnson (mrjohn@wpi.edu).
2) T, 10/1 Retake I 5-6pm (if needed)
3) F, 10/4 Retake II 5-6pm (if needed) *
* More basic skills attempts offered at the start of B-term if needed.

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 fail on the first try.
- Sections covering integration techniques from 1.5-1.6, 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.

Worcester Polytechnic Institute

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 accommodations, 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 accommodations 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.
No texting during class. Computer use only related to class is acceptable.
Reasons for missing exams, labs, or conference need 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 accommodations and helps with testing strategies to improve student performance. They help with anxiety and other issues.

Worcester Polytechnic Institute

Class Schedule		Topics
Class 1	R, 8/22	Course Introduction and V1 4.10 Antiderivatives
Class 2	F, 8/23	1.1 Approximating Areas
Class 3	M, 8/26	1.2 The Definite Integral
Class 4	T, 8/27	1.3 The Fundamental Theorem of Calculus
Class 5	R, 8/29	1.4 Integration Formulas and the Net Change Theorem
Class 6	F, 8/30	1.5 Substitution
Class 7	T, 9/3	1.5 Substitution in Definite Integrals &
		1.6 Integrals Involving Exponential and Logarithmic Functions
Class 8	R, 9/5	Review for Test 1
-----	Test 1 Material Class 1-8 ----------	
Class 9	F, 9/6	Test 1: V1 4.10, V2 1.1-1.5
==========		
Class 10	M, 9/9	3.1 Integration by Parts
Class 11	T, 9/10	3.1 Integration by Parts & 3.2 Trigonometric Integrals
Class 12	R, 9/12	3.2 Trigonometric Integrals
Class 13	F, 9/13	3.3 Trigonometric Substitution
Class 14	M, 9/16	3.4 Partial Fractions
Class 15	T, 9/17	3.4 Partial Fractions
Class 16	R, 9/19	3.6 Numerical Integration
Class 17	F, 9/20	2.1 Area for Plan Region
Class 18	M, 9/23	2.2 Volumes using Disks & Washers
------	Basic Skills 1 Material Class 11-18 ----------	
Class 19	T, 9/24	Review for Basic Skills & Test 2
Basic Skills	T, 9/24	6-7pm Room TBA
-------	Test 2 Material Class 10-18 ----------	
Class 20,	R, 9/26	Test 2: V2 1.6, 2.1, 3.1-3.4, 3.6
==========		
Class 21,	M, 9/30	2.4 Arc Length and Surfaces of Revolution
Class 22	T, 10/1	2.6 Centers of Mass
Class 23	R, 10/3	2.7 Natural Logarithm as an Integral
Class 24	F, 10/4	2.8 Exponential Growth and Decay
Class 25	M, 10/7	2.8 Exponential Growth and Decay
Class 26	T, 10/8	Review for Final Exam
Class 27	R, 10/10	Optional Class
------	Test 3 Material Class 19-26 ----------	
Class 28	R, 10/10	Comprehensive Final 5-7pm Room TBA (50% Chapter 2, 50% other)
==========		