Worcester Polytechnic Institute

MA 1023 Calculus III
Mathematics Department
Fall B Term 2024

Professor:
Teaching Professor Michael R. Johnson, PhD
Email: mrjohn@wpi.edu
Phone: 508-831-5134
Office location: Stratton Hall (SH 421)

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 books V2 and V3 at a price of $40 each 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/MATLAB** - used for labs and in class.

Course Description:
https://www.wpi.edu/pages/syllabus-ma-1021-1024-using-thomas-hass-heil-weir-15th-ed-early-transcendentals-published
Chapters 4.8 (V1), 3.7 (V2): Indeterminate forms and Improper integrals (3 classes)
Chapter 5.1-5.6 (V2) : Infinite Series and Convergence Tests (6 classes)
Chapter 6.1-6.4 (V2) : Power Series and Taylor Polynomials (4 classes)
Chapter 1.1-1.4 (V3) : Parametric Curves and Polar Coordinates (5 classes)
Chapter 2.1-2.5 (V3) : Vectors, Curves, Lines and Planes in Space (3 classes)
Chapter 3.1-3.4 (V3) : Curves and Motion in Space (4 classes)

Calculus III at WPI implements many concepts.
It begins with a demonstrating behavior toward infinity. Applied to Calculus I-II concepts of limits, integrals, and summations. Approximation of functions using power and Taylor series.

In the second half of the course, we formulate variable forms to time and polar translations. We construct lines, planes, vectors, and curves in three-dimensional space. Investigating application to curves and motion conclude the course material.

Prerequisite Courses:
Calculus I-II. Use of differential and integral calculus.

Worcester Polytechnic Institute

Learning Outcomes:

- Appraise the results of infinite behavior for limits, integrals, and sums.
- Use and interpret series Power and Taylor series approximations.
- Adapt differentiation and integrations and value the change of variable forms involving time and polar forms.
- Extend formulations of vectors, lines, and planes to three-dimensions. Select and use applications of curves and motion in space.

Office Hours:

M 2-3pm and TRF 10-11am in SH 421 or by appointment

PLA (Peer Learning Assistants):

Discussion:

Devin Roskoph BD01 W 8-8:50am in SH 313 (9am class)
Luke Ciarletta BD04 W 2-2:50pm in SH 313 (9am class)
Rholee Xu BD07 W 11-11:50am in SH 313 (8am class)

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

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.

ARC:

The Academic Resources Center (ARC) provides tutoring for all undergraduate students, free of charge. Schedule one-on-one tutoring (M-R 10-9pm) in advance and sign up at tutortrac.wpi.edu.

MASH:

Math & Science Help (MASH) is drop-in tutoring with no appointment needed. MASH is a great way to get a quick question, help with homework, and explanation on theories answered. Students can come alone or bring friends. All tutors are undergraduate students who have been successful in the course themselves.

Worcester Polytechnic Institute

Course Details:

- Lecture MTRF 8-8:50am (Section 3) and 9-9:50am (Section 1)
  SL 104 is the classroom for both times.
- Labs In-Person
  Lab 1 Improper Integrals: R, 10/24 or F, 10/25 due W, 10/30
  Lab 2 Geometric Series: R, 11/7 or F, 11/8 due W, 11/13
  Lab 3 Parametric Curves: R, 11/21 or F, 11/22 due W, 12/4
- Discussion Every Wednesday
- 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.

Course Requirements:

1. **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.

3 Exams	70%	Test 1: F, 11/8 (11) Ch 4.8 (V1), 3.7, 5.1-5.6 (V2)
(25-25-20% for lowest)		Test 2: T, 11/26 (21) Ch 6.1-6.4 (V2), 1.1-1.4 (V3)
		Test 3: F, 12/13 (28) Ch 2.1-2.5, 3.1-3.4 (V3)
Labs	10%	Lab #1: W, 10/30
		Lab #2: W, 11/13
		Lab #3: W, 12/4

   HW Problem Sets (Friday) **8%**
   8% 10/25 (4), 11/1 (8), 11/15 (15), 11/22 (19), Wednesday 12/11 by 6pm (26)
   Webwork (Wednesday) **8%**
   10/30 (6), 11/6 (9), 11/13 (13), 11/20 (17), 12/4 (22), Friday 12/6 (24)
   Quizzes (Wednesday) **4%**
   10/30 (6), 11/20 (17), 12/4 (22)
2. **Assignments**
   HW Problem Sets requiring an upload of a PDF electronic submission by 11pm on due dates. Webworks are due at 11pm on due dates.
3. **Late Work Policy**
   I accept late work but at a 10% daily deduction. This will be allowed until solutions post for the assignment (no more than 3 days). Please start assignments early and communicate with me to discuss questions. Feel free to talk if you encounter difficult circumstances.

Worcester Polytechnic Institute

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.

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.

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 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.
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. They also help with anxiety and other issues.

Worcester Polytechnic Institute

Class Schedule		Topics
Class 1	**M, 10/21**	4.8 (V1) Indeterminate Forms
Class 2	**T, 10/22**	4.8 (V1) Indeterminate Forms / 3.7 (V2) Improper Integrals
Class 3	**R, 10/24**	3.7 (V2) Improper Integrals continued
Class 4	**F, 10/25**	5.1 (V2) Sequences
Class 5	**M, 10/28**	5.2 (V2) Infinite Series
Class 6	**T, 10/29**	5.3 (V2) Divergence and Integral Tests
Class 7	**R, 10/31**	5.4 (V2) Comparison Tests
Class 8	**F, 11/1**	5.5 (V2) Alternating Series
Class 9	**M, 11/4**	5.6 (V2) Ratio and Root Tests
Class 10	**R, 11/7**	6.1 (V2) Power Series and Functions and Review for Exam 1
----- Test 1 Material Class 1-9 ----------		
Class 11	**F, 11/8**	**Exam 1: 4.8 (V1), 3.7 (V2), 5.1-5.6 (V2)**
==========		
Class 12	**M, 11/11**	6.2 (V2) Properties of Power Functions
Class 13	**T, 11/12**	6.3 (V2) Taylor and Maclaurin Series
Class 14	**R, 11/14**	6.4 (V2) Working with Taylor Series
Class 15	**F, 11/15**	1.1-1.2 (V3) Parametric Equations and Calculus of Parametric Curves
Class 16	**M, 11/18**	1.3 (V3) Polar Coordinates
Class 17	**T, 11/19**	1.4 (V3) Area and Arc Length in Polar Coordinates
Class 18	**R, 11/21**	1.4 (V3) Area and Arc Length in Polar Coordinates
Class 19	**F, 11/22**	2.1-2.2 Three-Dimensional Systems and Vectors
Class 20	**M, 11/25**	Review for Exam 2
----- Test 2 Material Class 12-17 ----------		
Class 21	**T, 11/26**	**Exam 2: 6.1 -6.4 (V2), 1.1-1.4 (V3)**
==========		
Class 22	**M, 12/2**	2.3-2.4 Dot and Cross Product
Class 23	**T, 12/3**	2.5 Equations of Lines and Planes in Space
Class 24	**R, 12/5**	3.1-3.2 Curves and Integrals of Vector Functions
Class 25	**F, 12/6**	3.3-3.4 Arc Length, Curvature, and Normal Vectors
Class 26	**T, 12/10**	3.4 Curvature and Normal Vectors of a Curve
Class 27	**R, 12/12**	Review for Exam 3
------- Test 3 Material Class 20-26 ----------		
Class 28	**F, 12/13**	**Exam 3: 2.1-2.5, 3.1-3.4 (V3)**
==========		