

**Instructor:** Tatiana Doytchinova  
**Office hours:** Mon 10:00 am – 10:50 am  
 Thu 9:00 am – 9:50 am  
 or by appointment

**email:** [tdoytchinova@wpi.edu](mailto:tdoytchinova@wpi.edu)  
**Office:** Stratton Hall 422

**Scheduled Meeting Times:**

Section	Lectures
FL01	MT-R 8:00-8:50 in Higgins Labs 116
FL03	MT-R 12:00-12:50 in Unity Hall 405

**Discussion Times with TAs:**

Section	Discussion Time	Location	TA
FD01	F 8:00 - 8:50	Stratton Hall 311	MollyAnn Burkey (mburkey@wpi.edu)
FD02	F 10:00 - 10:50	<u>Stratton Hall 301</u>	MollyAnn Burkey (mburkey@wpi.edu)
FD03	F 11:00 - 11:50	<u>Stratton Hall 301</u>	Cameron Norton (cjnorton@wpi.edu)
FD06	F 3:00 - 3:50	<u>Stratton Hall 313</u>	Cameron Norton (cjnorton@wpi.edu)

**SYLLABUS**

**RECOMMENDED BACKGROUND:** Basic Algebra and Precalculus.

**TEXTBOOKS (recommended, not required):** Herman and Strang, Calculus Volume 1 (OpenStax)  
<https://openstax.org/details/books/calculus-volume-1>

There are many calculus textbooks. It does not matter which one you will read as long as you read it. Here are two books that I consider useful and good:

- 1) Thomas' Calculus, Early Transcendentals (any other edition)
- 2) Stewart, James, Calculus: Early Transcendentals (any edition)

You can just use the class notes.

**COURSE COVERAGE.** The course consists of four main parts which correspond to the first four chapters of the textbook:

- **Functions.** Review of important algebraic formulas. Review of basic functions: domain and range, sketching, odd and even functions.
- **Limits and Continuity.** Limit of a function, limit laws, one-sided limits, continuity, limits involving infinity, asymptotes to the graphs.
- **Derivatives.** Definition of the derivative, tangent to a curve at a point, the derivative as a function, differentiation rules, the Chain rule, implicit differentiation, logarithmic differentiation, derivatives of inverse functions, related rates, linearization and differentials.
- **Applications of Derivatives.** Extreme values of functions, the Mean Value Theorem, monotonic functions and First Derivative Test, concavity, Second Derivative Test, curve sketching, applied optimization.

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

## COURSE OBJECTIVES FOR STUDENTS.

- Learn the fundamental principles of Differential Calculus. Gain factual knowledge relative to: limits, continuity, derivatives, differentiation techniques, optimization, the Mean Value Theorem, First Derivative Test, Second Derivative Test, and curve sketching.
- 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.
- Understand when linear approximation can reasonably be applied, and use this technique to estimate function values that would otherwise be computationally difficult.
- Apply Differential Calculus techniques to solve and interpret word problems.

**ASSESSMENT.** Your final grade for the course will be based on the degree of mastery of the course content listed above, as measured by your performance on quizzes, tests, and the final exam.

**ATTENDANCE.** You are supposed to spend 12 hours per week on this course. Of these, you will be spending 4 hours per week in class for: three hours of lectures and one discussion session. You are expected to attend all lectures and all discussions (if you miss a class, it is **your** responsibility to make a copy of the class notes from another student and make sure you learn what you have missed).

**HOMEWORK and QUIZZES.** Homework is assigned for each section of the book covered and is a required component of the course. Working the exercises is intended to help you learn, and give you some perspective on your progress. If you do not do homework regularly, you will not learn. I suggest that you keep a notebook to write the homework in (this could be the same notebook in which you write your lecture notes). Discipline yourself to write clear readable notes and solutions, they will be of great value as review. Homework will **not** be collected for grading, but if you do not do it, you will not learn.

Short quizzes (intended for 10-15 minutes) will be given very often. The problems on quizzes will be very similar (although not exactly the same) to the homework problems and problems discussed during the lectures. Quizzes will account for 20% of your grade.

Each student can retake (with different questions) a quiz **once within two weeks after the quiz was given**. You can retake even all quizzes, but no more than one retake per quiz is allowed and each quiz you decide to retake must be taken **within two weeks after the quiz was given in class.** (If you retake a quiz, the highest of the two scores will be used.) **The retake quizzes will be given only during discussion sessions on Fridays! If you miss a discussion session for a legitimate reason, you will be able to retake a recent quiz during the TA's office hours.**

To help you prepare for the quizzes in a more focused and efficient way, solutions to the homework problems will be available ahead of time. You can look at my solutions when you work on your homework assignments, but remember that **no notes and no calculators will be allowed on quizzes, tests and the final exam.** Homework assignments (and my solutions for homework assignments) are intended to help you learn the material. Even if you understand my solutions, it does not mean you can solve the problems on your own! Just looking at my solutions will not help. But solving (or trying to solve) all the assigned problems and comparing your solutions with my solutions will help. In case you do not understand the posted solutions, contact the instructor (or the TA) as soon as possible.

**DISCUSSIONS.** Once a week, on Friday, you will attend in person a discussion session. This will give you an opportunity to discuss difficult material with your TA and go over the solutions to the practice problems. At the end of the discussion session you will be given an opportunity to retake a recent quiz. **The attendance of discussions is required!**

**TESTS, FINAL EXAM, BASIC SKILLS TEST.** There will be two in-class tests and a Final Exam on the following dates:

**Test1** -Tuesday, October 8, during the lecture

**Test2** - Monday, November 25 during the lecture

**Basic Skills Test** - Tuesday, November 26 during the lecture

**Final Exam** - Tuesday, December 10 during the lecture

There will be three in-class review sessions on the following dates:

Review for Test1 - Monday, October 7

Review for Test2 - Thursday, November 21

Review for Final Exam - Thursday, December 5

Each test and the Final Exam are timed and will take 50 minutes. This time limit will be strictly enforced. Make up tests will not be given, except in cases of documented illness or grave emergency. All quizzes and tests and the Final Exam are closed-book, in-class exams. No notes, written or electronic, are allowed. All cell phones must be in airplane mode and out of sight. All work must be shown to receive full credit.

Note: All students will be given an opportunity to retake (with different questions) one test of their choice (Test1 or Test2) on Tuesday, December 3 (during the lecture). **If you retake a test, the highest of your two scores will be kept.**

Basic Skills Test: In order to pass this course, students are required to pass a minimum competency exam. This Basic Skills test consists of 7 questions covering the fundamental concepts covered in this course. You must answer 5 (or more) of the questions correctly in order to pass the Basic Skills test.

- The Basic Skills test is strictly “pass/fail”, and is an additional requirement for passing the course.
- Your answers to the questions on the Basic Skills test are either “right” or “wrong” – no partial credit will be given.
- Students who pass the Basic Skills test will have their course grades assigned based on their total work in the course.
- Students whose total coursework in MA 1020 is not otherwise at a passing level will receive a grade of NR for this course, regardless of their score on the Basic Skills test.
- Students whose total coursework would result in a passing grade but do not pass the Basic Skills test will have two additional chances to re-take the Basic Skills test. Students who do not pass a re-take of the Basic Skills test will receive NR for the course.

**FINAL GRADE.** Your final grade will be calculated in the following way:

25% of the grade come from the Test1,

25% of the grade come from the Test2,

30% of the grade come from the Final Exam if the student passes the Basic Skills Test,

20% of the grade come from the Quizzes.

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

- An average of 90% and passing of the Basic Skills Test will ensure an A for the course.
- An average of 80% and passing of the Basic Skills Test will ensure a B for the course.
- An average of 65% and passing of the Basic Skills Test will ensure a C for the course.

Depending on the overall class performance and due to curving, the above target percentages could be lowered a little bit (do not count on it), however, they will not be raised. In other words, 90% performance guarantee you an A, etc.

**INTEGRITY.** Each student is expected to familiarize him/herself with WPI's Academic Honesty policies which can be found at <https://www.wpi.edu/about/policies/academic-integrity/dishonesty>. All acts of fabrication, plagiarism, cheating, and facilitation will be prosecuted according to the university's policy.

**ACADEMIC ACCOMODATIONS and DISABILITIES.** *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 should plan to contact them via email: [AccessibilityServices@wpi.edu](mailto:AccessibilityServices@wpi.edu) and/or via phone: (508) 831-4908 and/or by visiting Unity Hall, 5<sup>th</sup> floor. Use <https://www.wpi.edu/student-experience/resources/accessibility-services> for more information.*