

**MATH 108-002: Introductory Calculus with Business Applications**  
**Syllabus, Fall 2020**

**Course objectives.** To provide a basic firm understanding of elementary calculus, with a view towards applications to business and other disciplines. This course satisfies GMU's Quantitative Reasoning Foundation Requirement (see <https://chss.gmu.edu/general-education/all-requirements>). The learning outcomes that we will achieve to meet that requirement are:

1. Students are able to interpret quantitative information (i.e., formulas, graphs, tables, models, and schematics) and draw inferences from them.
2. Given a quantitative problem, students are able to formulate the problem quantitatively and use appropriate arithmetic, algebraic, and/or statistical methods to solve the problem.
3. Students are able to evaluate logical arguments using quantitative reasoning.
4. Students are able to communicate and present quantitative results effectively.

The course itself seeks to satisfy the following goals:

1. Students improve and solidify their algebraic skills.
2. Students understand and apply derivatives as a tool to analyze change in quantified models.
3. Students analyze and interpret results in the context of Business and IT applications.
4. Students understand and compute integrals and their relationship to derivatives.

**Prerequisite.** Minimum score of 13 in "Math Placement Algebra I."

**Required materials** (choose between options below).

1. Access Code only for the ebook of Barnett, Ziegler, Byleen, Stocker, Applied calculus for business, economics, life sciences, and social sciences, 14<sup>th</sup> edition. Any ISBN number.
2. The paper book of Barnett, Ziegler, Byleen, Stocker, Applied calculus for business, economics, life sciences, and social sciences, 14<sup>th</sup> edition. Any ISBN number.
3. The same book plus NEW online app MyMathLab (google for "CALCULUS F/BUS.,ECON... (LOOSE) - W/ACCESS").

**Note.** MyMathLab is optional for the course: the usage of MyMathLab may help you in mastering solving skills, but it will not be graded.

**To be covered.** Chapters 1-5 of the book (with some sections omitted).

**Recommended materials.**

4. Free online app WolframAlpha (<http://www.wolframalpha.com>).
5. The book of Mueller and Brent, Just-in-time trigonometry and early transcendental calculus, 4<sup>th</sup> edition, Pearson, 2013. ISBN-13: 978-0321671035. This book covers basic material on precalculus.

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**Lectures.** TR, 12:00 pm-01:15 pm via Blackboard Collaborate Ultra Course Room.

**Office hours.** Tuesdays, 1:30 pm-2:30 pm, or by appointment, via Blackboard Collaborate Ultra Course Room. Also, you can pose questions via email.

**Homework.** Problems for the homework are given in the course outline (see below). Although these will not be collected and graded, success in tests and final exam strongly depends on their completing and understanding.

**Tests and exam.** There will be five tests, and final exam. All tests and exam are conducted through BlackBoard Collaborate Ultra Course Room; they are open-book and open-notes. The way of submitting solutions will be announced separately and discussed during class.

**Attendance and make-ups.** Each student is expected to attend classes regularly. No make-ups for tests are allowed unless you provide a serious written excuse. Excused tests should be taken within a timely fashion before the next test.

**Grading.** Tests are 80% in total, and final exam is 20% of the score. There will be no curving, extra crediting, etc. Equivalence between scores and letters, recommended by GMU, is given in the table below.

A+	A	A-	B+	B	B-	C+	C	C-	D	F
100-96+	96-92+	92-89+	89-85+	85-80+	80-77+	77-73+	73-69+	69-66+	66-60+	60-0

**GMU policies on final exams.** The final exam may not be given during the last week of classes. If you need to change the date of your final exam for unusual circumstances, you have to obtain professor's approval at least a week prior to the last day of classes. Retaking tests and final exam is not permitted.

Absence from the final exam will not be excused except for sickness on the day of the exam confirmed by physician's note or for other causes approved by the student's academic dean or director. If a student missed the final exam due to illness or a family emergency, an incomplete grade (IN) may be assigned provided the student took all five tests. If absence from the final exam is unexcused, the grade for the course is F.

**Academic integrity and university policies.** Mason is an Honor Code university. See for other policies at <http://universitypolicy.gmu.edu/>. Students are responsible for knowing and following established policies.

**ODS.** If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services. All academic accommodations must be arranged through this office.

**Religious holydays.** If you observe upcoming religious holidays (see <https://ulife.gmu.edu/religious-holiday-calendar/>), please inform me one week in advance about a possible overlap with a day of quiz, midterm, or final exam.

WolframAlpha Notation and Commands	
plot $(x-2)/(x+3)$ from $x=0$ to 15	domain $\sqrt{7-x}$
range $x^2 - 1$	intercepts $3x - 4y = 12$
solve $3x - 4y = 12$ for $y$	intersect $1 + x$ and $x^2$
line through $(1,2)$ and $(2,1)$	limit $((x+2)/x)^2$ as $x \rightarrow 1$
limit $((x+2)/x)^2$ as $x \rightarrow \infty$	asymptotes $x^2/(2x-4)$
Tangent to $4x - x^2$ at $x = 3$	
differentiate $90x^2 - x^3$	differentiate $90x^2 - x^3$ at $x=15$
$d/dx$ for $(x^2+3x)/(x^2-4x)$	$d^2/dx^2$ for $(x^2+3x)/(x^2-4x)$
extrema of $5x^{2/3} + 3$	extrema of $5x^{2/3} + 3$ from $x=0$ to 5
critical values: solve $d/dx (x^3-5x+3)=0$	inflection of $x^3+9/2x^2-12x+11$
antiderivative of $x^5 - 3x^2 + 2$	integrate $x^5 - 3x^2 + 2$

## COURSE OUTLINE

Class Date	Tests	Sections	HW Problems
08/25		1.1	<b>1.1:</b> 47, 49, 51, 61, 63, 65, 85, 87, 89.
08/27		1.2	<b>1.2:</b> 11, 13, 19, 27, 29, 31, 43, 45, 47, 49, 51,
09/01		1.3	<b>1.3:</b> 11, 13, 15, 17, 29, 31, 33, 37, 49, 51, 69, 71, 73, 75.
09/03		1.4	<b>1.4:</b> 7, 9, 23, 27, 33, 37, 41, 43, 57, 59.
<b>09/08</b>	<b>Test 1</b>		Sections 1.1, 1.2, 1.3, 1.4
09/10		1.5	<b>1.5:</b> 29, 31, 35, 39, 43, 53.
09/15		1.6	<b>1.6:</b> 7, 17, 21, 29, 33, 37, 47, 51, 85.
09/17		2.1	<b>2.1:</b> 33, 37, 39, 41, 43, 51, 53, 59, 73, 77, 91.
09/22		2.2	<b>2.2:</b> 17, 19, 33, 35, 37, 39, 41, 47, 81, 83.
<b>09/24</b>	<b>Test 2</b>		Sections 1.5, 1.6, 2.1, 2.2
09/29		2.4	<b>2.4:</b> 21, 25, 35, 41, 81, 83.
10/01		2.5	<b>2.5:</b> 11, 15, 19, 23, 33, 37, 41, 45, 49, 53, 95, 97.
10/06		2.7	<b>2.7:</b> 9, 13, 17, 21, 37, 43, 45.
10/08		3.1 3.2	<b>3.1:</b> 13, 17, 27, 29, 31, 35, 37, 43, 47. <b>3.2:</b> 7, 11, 13, 15, 19, 25, 31, 35, 47, 51, 55, 67, 71, 75.
10/13		Practice	
<b>10/15</b>	<b>Test 3</b>		Sections 2.4, 2.5, 2.7, 3.1
10/20		3.3	<b>3.3:</b> 11, 15, 19, 31, 67, 77, 81, 93, 95, 97.
10/22		3.4	<b>3.4:</b> 9, 11, 21, 25, 33, 39, 45, 49, 53, 91, 95.
10/27		3.7	<b>3.7:</b> 3, 9, 13, 17, 21, 31, 33, 43, 47, 51, 59, 69, 83, 85, 87, 89, 91.
10/29		4.1	<b>4.1:</b> 27, 29, 33, 85, 87, 91, 93, 95, 97.
11/03		Election Day	
<b>11/05</b>	<b>Test 4</b>		Sections 3.2, 3.3, 3.4, 3.7
11/10		4.2	<b>4.2:</b> 1, 3, 5, 17, 21, 23, 25, 31, 33, 37, 39, 87, 89, 91, 93, 97.
11/12		4.5	<b>4.5:</b> 19, 21, 23, 27, 35, 43, 45, 67.
11/17		5.1	<b>5.1:</b> 3, 7, 9, 11, 17, 21, 23, 43, 45, 49, 51, 69, 81, 83, 85, 91.
11/19		5.2	<b>5.2:</b> 9, 11, 13, 15, 17, 19, 23, 27, 31, 59, 61, 77, 79, 81, 83.
<b>11/24</b>	<b>Test 5</b>		Sections 4.1, 4.2, 4.5, 5.1
11/26		Thanksgiving	
12/01		5.4	<b>5.4:</b> 31, 33, 35, 43, 45, 47, 49.
12/03		5.5	<b>5.5:</b> 13, 17, 21, 25, 33, 39, 45, 69, 71, 75, 79, 81.
<b>12/10</b>	<b>Final exam</b>		<b>10:30 am – 1:15 pm</b>