MATH 108-002: Introductory Calculus with Business Applications
Syllabus, Fall 2021

Course objectives. To provide a basic and 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, 14th edition. Any ISBN number.

2. The paper book of Barnett, Ziegler, Byleen, Stocker, Applied calculus for business, economics, life sciences, and social sciences, 14th 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 1-4 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, 4th 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, Horizon Hall 2014.

Office hours. TR, 1:30 pm-2:30 pm. Please email me to make an appointment.

Tutoring. Free tutoring is available at Math Tutoring Center (Johnson Center, Room 344); for hours of operation, visit

https://science.gmu.edu/academics/departments-units/mathematical-sciences/math-tutoring

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 <u>four tests,</u> and <u>final exam</u>. These are closed-book and closed-notes.

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

Grading. Each test and the final exam make up to 20% of the score. <u>There will be no curving, extra crediting, etc</u>. Equivalence between scores and letter grades, 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 are not permitted.

Absence from the final exam will not be excused except for sickness on the day of the exam <u>confirmed by physician's note</u> or for other causes <u>approved by the student's academic dean or director</u>. If a student missed the final exam due to illness or a family emergency, an <u>incomplete grade</u> (IN) may be assigned provided the student took all four 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 ->1
limit ((x+2)/x)^2 as x ->infinity	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 5 x^(2/3) + 3	extrema of 5 x^(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	Events	Sections	HW Problems
08/24		1.1	**1.1**: 47, 49, 51, 61, 63, 65, 85, 87, 89.
08/26		1.2	**1.2**: 11, 13, 19, 27, 29, 31, 43, 45, 47, 49, 51,
08/31		1.3	**1.3**: 11, 13, 15, 17, 29, 31, 33, 37, 41, 43, 49, 51, 69, 71, 73, 75.
09/02		1.4	**1.4**: 7, 9, 23, 27, 33, 37, 41, 43, 57, 59.
09/07		Practice	
09/09	**Test 1**		Sections 1.1, 1.2, 1.3, 1.4
09/14		1.5	**1.5**: 29, 31, 35, 39, 43, 53.
09/16		1.6	**1.6**: 7, 17, 21, 29, 33, 37, 47, 51, 85.
09/21		2.1	**2.1**: 33, 37, 39, 41, 43, 51, 53, 59, 73, 77, 91.
09/23		2.2	**2.2**: 17, 19, 33, 35, 37, 39, 41, 47, 81, 83.
09/28		Practice	
09/30	**Test 2**		Sections 1.5, 1.6, 2.1, 2.2
10/05		2.4	**2.4**: 21, 25, 35, 41, 81, 83.
10/07		2.5	**2.5**: 11, 15, 19, 23, 33, 37, 41, 45, 49, 53, 95, 97.
10/12	**Fall Break**		
10/14		2.7	**2.7**: 9, 13, 17, 21, 37, 43, 45.
10/19		3.1 3.2	**3.1**: 13, 17, 27, 29, 31, 35, 37, 43, 47. **3.2**: 7, 11, 13, 15, 19, 25, 31, 35, 47, 51, 55, 67, 71, 75.
10/21		Practice	
10/26	**Test 3**		Sections 2.4, 2.5, 2.7, 3.1
10/28		3.3	**3.3**: 11, 15, 19, 31, 67, 77, 81, 93, 95, 97.
11/02		3.4	**3.4**: 9, 11, 21, 25, 33, 39, 45, 49, 53, 91, 95.
11/04		3.7	**3.7**: 3, 9, 13, 17, 21, 31, 33, 43, 47, 51, 59, 69, 83, 85, 87, 89, 91.
11/09		4.1	**4.1**: 27, 29, 33, 85, 87, 91, 93, 95, 97.
11/11		Practice	
11/16	**Test 4**		Sections 3.2, 3.3, 3.4, 3.7
11/18		4.2	**4.2**: 1, 3, 5, 17, 21, 23, 25, 31, 33, 37, 39, 87, 89, 91, 93, 97.
11/23		4.5	**4.5**: 19, 21, 23, 27, 35, 43, 45, 67.
11/25	**Thanksgiving**		
11/30		Practice	
12/02		Practice	
12/09	**Final exam**		**10:30 am – 1:15 pm**