

MA 200 – Calculus I

Fall, 2020

Instructor: Dr. Kathy Pilger
 Office: AL 55
 Office Hours: Daily 10:00 a.m. via Teams, others by appointment
 Email: kpilger@bju.edu
 Textbook(s): *Calculus, 10th edition, Larson Edwards*
 Calculator Requirements: TI 89 or Nspire CAS (or TI 83, 84 or Nspire if final mathematics course).

Catalog Description: Introduction to analytic geometry, functions, limits and differentiation of algebraic functions and transcendental functions, definite and indefinite integration, and applications.

Prerequisites: At least a grade of C in MA 105, Trigonometry, or by placement test or with ACT score of 31+

Context: The faculty of the Division of Mathematical Sciences has developed five broad goals and has aligned these goals with the Bob Jones University Institutional Goals (IG) and the goals of the Bible and Liberal Arts Core (BLA). We believe these goals support the IG/BLA of the University. These Division Goals (DG) are to:

1. Mature the student in the theory and applications of mathematics and computer science.
2. Provide the student the required mathematical and computing background to function and contribute effectively in today's technological society.
3. Provide the student a platform for continued learning and development of his God-given abilities.
4. Instill in the student a desire to use his abilities in service to Christ.
5. Provide an appropriate liberal arts complement to a wide variety of majors.

Course Goals (CG):

1. Ensure that students have the mathematical skills needed to be successful in everyday life. (DG 1, 2, 5)
2. Demonstrate mathematics as a tool that reveals God's handiwork in the world around us. (DG 4)
3. To develop within the student the conviction that God's creation is rationally knowable, thus denying the prospect that this orderly world was derived from chaos. (DG 4)
4. To develop Christlike qualities such as perseverance, diligence, and dependence on God. (DG 3, 4)
5. To develop mathematical maturity, independent thinking, and reasoning skills (DG 1)
6. To develop a greater appreciation for the beauty and power of Calculus (DG 1, 3)
7. To develop a greater interest in exploring mathematical ideas independent of the teacher (DG 1, 3)
8. To prove the basic theory of Differential and Integral Calculus (DG 1, 2, 3)
9. To develop mathematical modeling and problem solving skills with the power of Calculus tools (DG 2)
10. To develop skill and techniques of differentiation and integration--the basic computations of calculus (DG 2, 3)

Course Objectives:

	The students will be able to	Course Goals Supported	Course Content	Assessment
1.	Write the definitions of all terms and concepts encountered during the semester. (NCTM/CAEP A.5.1)*	4, 5, 6, 8	Chap P-4, 7	Tests
2.	Write the statements of all theorems with names (ie. Mean Value theorem) encountered during the semester. (NCTM/CAEP A.5.1)	4, 6, 8	Chap P-4, 7	Tests
3.	To write the proofs of all theorems proven in class. (NCTM/CAEP A.5.1)	4, 5, 6, 8	Chap P-4, 7	Tests

4.	To evaluate existing “proofs” to determine if a proof is valid or not. (NCTM/CAEP A.5.1)	4, 5, 6, 8	Chap P-4, 7	Tests
5.	Use numerical evaluation of limits to estimate the value of a limit. (NCTM/CAEP A.5.1)	9, 10	Chap 1	Quiz, Test
6.	Use numerical integration techniques to estimate the value of a definite integral. (NCTM/CAEP A.5.1)	9,10	Chap 4	Quiz, Test
7.	Relate geometric concepts to finding the area between curves, volumes and surface areas of solids of rotation, and arc length. (NCTM/CAEP A.5.5)	1, 3, 5, 6, 9, 10	Chap 7	Quizzes, Tests
8.	To solve problems involving the following skills: (1) finding solutions to equations and inequalities, (2) graphing functions and relations, (3) solving absolute values and inequalities, (4) finding limits of algebraic and trigonometric functions, (5) differentiating and integrating algebraic and trigonometric functions, (6) finding maxima and minima (NCTM/CAEP A.2.2, A.5.5)	1, 2, 3, 4, 5, 6, 9, 10	Chap P-4, 7	Quizzes, Tests
9.	To use a graphing calculator to explore problems not normally treatable in a “standard” calculus class, and thus lead to a deeper understanding of some concepts like limit. (NCTM/CAEP A.5.5)	1, 7, 9	Chap P-4, 7	Quizzes, Tests
10.	To apply the skills and knowledge gained in this class to situations encountered in life, i.e. word problems. (NCTM/CAEP A.5.5)	1, 7, 9, 10	Chap P-4, 7	Tests, Takehome

*National Council of Teachers of Mathematics (NCTM/CAEP) Content Standards

BIBLICAL MANDATE FOR THIS COURSE

The source of wisdom and knowledge is the Lord and a keen mind is a gift from God. It is my hope that mathematical study will show you the greatness of God and increase Christlikeness in you (Colossians 1:17 and Philippians 2:5). God has given man the capacity to reason mathematically and expects you to be able to reason logically (Isaiah 1:18). The study of mathematics helps to develop your God-given ability to reason. As a Christian, you need to be able to discern truth and filter ideas through a biblical worldview. Also, mathematics is the study of the underlying structure of the universe and its intelligent design. Mathematics is an avenue of studying the God-created universe in its complexity, harmony, and precision. Math is a tool that can help you fulfill the God-given mandate found in Genesis 3:28 to exercise dominion over the earth.

The study of mathematics from a Christian perspective will help you to better know God and imitate Him more closely. You can see the consistency of God in the consistency of His universe. Because of this consistency, we can model a physical law and study it through mathematics. The study of mathematics can also help you to develop Christ-like character traits such as diligence, honesty, precision, perseverance, and humility.

Note: Calculus is the foundation for most of the math you will need in your upper level science and math classes. Learn it well.

Grades:

Tentative Assignments	Points
Daily Problems (DPP)	60
In-Class Chapter Tests	600
Take-Home Tests	120
Theory Test	100
In-Class Quizzes	80
Theoretical Paper	50
Homeworks	70
Final Exam	150
Total	1230

Extra Credit:

Each chapter has review problems at the end of the chapter in which the problems do not specify the section from which they come. Thus, you must determine which concepts and solution methods are necessary for solving these problems, similar to what you must do on each chapter test. Doing these problems will better prepare you for each chapter test. Thus you may earn **3 pts of extra credit per chapter** for doing the odd-numbered problems in the Chapter Review section for Chapters P, 1 and 2, 3, 4. You may also earn **2 pts of extra credit each** for reading sections 3.8 and 3.9 and doing the assigned problems listed here.

Sec 3.8 - 1, 5, 15, 19, 21, 23, 25

Sec 3.9 - 1, 7, 9, 11, 21, 25, 29, 43-45, 47-49

Thus, you may earn up to **19 pts of extra credit** for the semester. Take advantage of it!!

Grading Scale:

90% - 100%	A
80% - 89%	B
70% - 79%	C
60% - 69%	D

Need Help?

I want you to be successful in this class. You must seek help when needed because you are the only one who knows when you need it. If you need help, reach out in one of the following ways:

1. Online solutions to homework problems – Slader.com for all problems, CalcChat.com for odd-numbered problems. Solutions manuals with work available on Reserve in Mack Library.
2. Teacher – Use me – I want to see you in my office.
3. Classmates – Find a Study Buddy.
4. Help Session run by the Academic Resource Center

Daily Practice Problems (DPP):

The first 5 minutes of each non-test class period two questions/problems will be given. Each correct answer will be worth 1 point with a maximum of 6 point per week. You will write the answer on one side of a provided 3 x 5 card.

Quizzes:

Quizzes will be announced or unannounced. Always be ready. The lowest quiz grade will be dropped when calculating final grades. Missed quizzes due to absence of any kind will not be made up.

Homework:

Homework is crucial to success in this course. It is also one of the primary means by which you represent yourself as a “professional” in academia, and the way in which you will develop the mathematical habits that will help you be successful on the larger quizzes and tests. Therefore we have the following expectations for homework, and failure to meet these expectations may mean that your assignment will be returned to you to be corrected.

- Homework must be neat and well organized. This means neatly written work and pages with no wrinkles, little edges from a spiral notebook, etc. Section numbers and page numbers should appear at the beginning of each new section.
- Homework should be worked out in detail. **Answers alone are not acceptable.**
- Problems should be worked going down the page, not across. You may use both sides of the paper. Do not crowd your work. Attempt to line up equal signs when appropriate.
- You are responsible for checking all of your homework problems from the answers in the back of the book. Detailed solutions to the odd-numbered problems are available on CalcChat.com. Solutions to all problems are available on Slader.com
- Homework will be collected several times throughout the chapter. This will encourage you to keep up with your homework as it is covered in class. Doing the assigned homework is only the first step to learning the material. You don't truly begin studying for the chapter test until you have done all of the homework and then spend time looking at how the concepts fit together as a whole. There will be a total of 10 points per chapter for homework.

Classroom Deportment:

Compliance with student handbook policies is expected during class. This includes the wearing of masks and social distancing by all students while in the classroom.

Cell Phones and Laptops:

Cell phones are not permitted to be out during class. Make sure they are muted and do not ring during class. There is little reason why a laptop should be used during a math class. You should have pencil, paper, and your textbook out and ready to use in class. If for some reason you have a legitimate need of a laptop in class, please see me and we will discuss this need.

Accommodations for students with disabilities:

If you have a documented learning disability or if you are impaired in some way (auditory, visual, cognitive, neurological, or physical), please let your instructor know this within the first week of the course so that any necessary adjustments can be made before you get behind.

Attendance Policy:

Regular attendance is very important in this class. If you miss a class you will be missing some essential information that will help you be more successful in your career. I will follow the BJU Attendance Policy that is set forth in your Student Handbook. For additional information, please see the Bob Jones University 2020-21 Student Handbook.

Naturally, if you are absent on a day when you have been informed in advance that work is due, then the late policy is (10% deduction for each calendar day late) and applies for that assignment regardless of the nature of the absence.

Academic Integrity:

Doing your own work brings Glory to God. The claiming of someone else's work as your own is cheating and is a sin. All work done for this class needs to be your own. If information is taken from other sources, it always needs to be referenced and credit given where it is due. I value academic integrity. Therefore, I will take appropriate action if cheating or plagiarism occurs in this course. For additional information, please see the Bob Jones University 2020-21 student handbook. **You may *not* work together on take-home questions.** I encourage you, however, to work together on your homework.

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CALCULUS FOREVERS

STATEMENTS OF DEFINITIONS AND THEOREMS:

CHAPTER P

SLOPE
ABSOLUTE VALUE
TRIANGULAR INEQUALITY
LESS THAN
FUNCTION

CHAPTER ONE

LIMIT (OF A FUNCTION AT A POINT)
SANDWICH THEOREM
CONTINUITY (AT A POINT)
INTERMEDIATE VALUE THEOREM

CHAPTER TWO

DERIVATIVE (OF A FUNCTION AT A POINT)
CHAIN RULE

CHAPTER THREE

ABSOLUTE MAXIMUM	ABSOLUTE MINIMUM
LOCAL MAXIMUM	LOCAL MINIMUM
INCREASING FUNCTION	DECREASING FUNCTION
CRITICAL VALUE	EXTREME VALUE THEOREM
ROLLE'S THEOREM	MEAN VALUE THEOREM
CONCAVE DOWNWARD	CONCAVE UPWARD
INFLECTION POINT	

CHAPTER FOUR

INDEFINITE INTEGRAL
DEFINITE INTEGRAL
LIMIT OF A REIMANN SUM
MEAN VALUE THM (FOR INTEGRALS)
FUNDAMENTAL THEOREM OF CALCULUS (PARTS 1 AND 2)

PROOFS

1. TRIANGULAR INEQUALITY
2. LIMIT OF A CONSTANT
3. LIMIT OF A SUM
4. DERIVATIVE OF A SUM
5. PRODUCT RULE
6. CHAIN RULE
7. ROLLE'S THEOREM
8. MEAN VALUE THM
9. MEAN VALUE THM (FOR INTEGRALS)
10. FUNDAMENTAL THM OF CALCULUS (BOTH PARTS)

Ma 200 Fall, 2020 Schedule

Tentative Schedule			
Date	Day	Class	Assignment
Aug. 18	T	Syllabus, P.1, P.2, P.3 Educreations Videos	
Aug. 19	W	Appendix C.1	
Aug. 21	F	Section 1.1	HW Completed: P.1 - 1-4, 5, 11- 27 odd, 31, 35, 45, 59, 61, 71, 73, 77-80 HW Completed: P.2 - 1-7 odd, 8, 11, 13, 14, 18, 19, 21, 25-30, 33-36, 41, 45, 48, 51, 61, 65, 67, 70, 74 HW Completed: P.3 - 2, 7, 9, 16, 22, 23, 28, 29, 37, 41-44, 45, 48, 53, 55-60, 61 (a, c, e, g, f), 65, 67, 71, 79, 94, 101
Aug. 24	M	Review	HW Completed: C.1 - 15, 16, 17, 19, 21-24, 26, 27, 29, 30, 31, 33, 37, 38, 39, 41, 43, 53, 54, 57, 58, 59, 62, 67-72, 73-75, 82
Aug. 25	T	Test: Chapter P and Appendix C.1	
Aug. 26	W	Section 1.2	HW Completed: 1.1 - 1, 3, 4, 5a, 6, 9, 10
Aug. 28	F	Section 1.3	HW Completed: 1.2 - 1, 3, 4, 7, 15, 17, 19-21, 23-35 odd, 39, 41, 43, 44, 47, 51, 58-60, 67-70
Aug. 31	M	Section 1.4	HW Completed: 1.3 - 1, 4, 5-21 odd, 25, 27, 29, 31, 33, 37, 39, 43, 47-61 odd, 63, 65, 67, 69, 71, 73, 83-89 odd, 95, 103-104, 115, 117-120, 122
Sept. 1	T	Section 1.4	HW Completed: 1.4 - 1-19 (odd), 29, 31, 33, 35
Sept. 2	W	Section 1.5	HW Completed: 1.4 - 47, 61, 65, 69, 87, 91, 97, 99, 103-106, 111, 113
Sept. 4	F	Appendix C.3	HW Completed: 1.5 - 1-3, 5-8, 9, 13-23 (odd), 29-41 (odd), 51, 53, 57, 71
Sept. 7	M	Review/Catch up	HW Completed: C.3 - 5, 7, 9, 11, 17, 21, 23, 27, 33, 35, 39, 41, 51, 55, 63
Sept. 8	T	Test: Chapter 1 and Appendix C.3	
Sept. 9	W	Section 2.1	
Sept. 11	F	Section 2.2	Theoretical Project Part 1 Due in Dropbox by 11:59 p.m. Turn in paper copy in class. HW Completed: 2.1 - 1, 3, 4, 5, 9, 11, 17, 23, 27, 31, 33, 39, 41-42, 47, 49, 51, 55, 58, 61, 65, 75, 79
Sept. 14	M	Section 2.3	HW Completed: 2.2 - 1a, 2b, 3-13 odd, 19, 21, 23, 27, 31, 35, 39, 43, 47, 51, 53, 57, 59, 61, 63, 65, 66, 69, 71, 73, 76, 87-92, 99, 101, 109, 111, 115, 118
Sept. 15	T	Section 2.3	HW Completed: 2.3 - 1-13, 15, 17, 25-49 (odd)
Sept. 16	W	Section 2.4	HW Completed: 2.3 - 55, 59, 65, 67, 75, 81, 83-85, 87, 91-97 (odd), 101-09 (odd), 113, 123, 131-137
Sept. 18	F	Section 2.4	HW Completed: 2.4 - 1-3, 7-31 (odd), 35, 39, 41-55 (odd)
Sept. 21	M	Section 2.5	HW Completed: 2.4 - 65, 67, 69, 73, 81, 89, 92, 95-96, 99-100, 101, 103, 114, 115, 116
Sept. 22	T	Review/Catch up	HW Completed: 2.5 - 1-9 (odd), 17, 21-25, 31, 45-46, 53-59 (odd), 67
Sept. 23	W	Test: Chapter 2 (Sections 1-5)	
Sept. 25	F	Section 2.6 - Hand out Take-Home Test - Part 1 (Related Rates)	
Sept. 28	M	Section 3.1	HW Completed: 2.6 - 1, 3, 5, 9, 11, 14-16, 17-18, 21, 23, 35, 49
Sept. 29	T	Section 3.2	HW Completed: 3.1 - 1-13 (odd), 17-25 (odd), 29, 52, 53, 55-58, 59, 63-66
Sept. 30	W	Section 3.2	
Oct. 2	F	Section 3.3	HW Completed: 3.2 - 1-11 (odd), 13-15, 29, 32-33, 37, 41, 47, 51, 53-56, 57, 65, 71, 73-76, 77
Oct. 5	M	Section 3.7	Take-Home Test (Part 1) due
Oct. 6	T	Section 3.7 - Hand out Take-Home Test - Part 2 (Applied Max/Min)	HW Completed: 3.3 - 1-11 (odd), 17, 21, 25, 29, 31, 33, 37, 60-61, 63-68, 70 (a, c), 89, 91-96
Oct. 7	W	Section 3.4	HW Completed: 3.7 - 1, 5, 9, 11, 15, 19, 21, 23, 29, 37, 38, 41
Oct. 9	F	Section 3.5	HW Completed: 3.4 - 1-2, 3, 5, 15, 21, 35, 37, 43, 47, 49, 52, 55, 61, 75-80
Oct. 12	M	Section 3.6	HW Completed: 3.5 - 3-8, 15, 17, 22, 23-29 (odd), 41, 42, 55

Oct. 13	T	Review/Catch up	HW Completed: 3.6 - 1-4, 5, 13, 15, 23, 35-37, 49, 55, 59
Oct. 14	W	Test: Chapter 3 (Sections 1-6)	
Oct. 16	F	Section 4.1	
Oct. 19	M	Section 4.2	Take-Home Test (Part 2) due HW Completed: 4.1: 1-9 (odd), 13-39 (odd), 59, 70-72
Oct. 20	T	Section 4.2	
Oct. 21	W	Section 4.3	HW Completed: 4.2: 3-9 (odd), 15-21 (odd), 31, 33, 37, 39, 43, 49, 57, 61
Oct. 23	F	Section 4.4	HW Completed: 4.3: 4, 7-17 (odd), 27-37 (odd), 41, 43, 63-66
Oct. 26	M	Section 4.4	HW Completed: 4.4: 9-31 (odd)
Oct. 27	T	Section 4.5	HW Completed: 4.4: 35-43 (odd), 49, 51, 55, 63, 66, 69, 75, 77, 83, 89
Oct. 28	W	Section 4.5	HW Completed: 4.5: 3-23 (odd), 33-43 (odd), 47, 57, 67, 68, 78
Oct. 30	F	Review/Catch up	HW Completed: 4.6: 1, 5, 13
Nov. 2	M	Test: Chapter 4 Theory (35 pts)	
Nov. 3	T	Test: Chapter 4 Problems (65 pts)	
Nov. 4	W	Section 7.1 – Hand out Take-Home Test Part 3	Theoretical Paper - Part 2 due
Nov. 6	F	Section 7.2	HW Completed: 7.1: 3, 5, 7, 18, 19, 23, 27, 33, 39, 43, 51, 55, 79
Nov. 9	M	Section 7.2	HW Completed: 7.2: 3-15 (odd), 19, 21, 55, 60, 63 (integrate by hand)
Nov. 10	T	Section 7.3	
Nov. 11	W	Section 7.4	HW Completed: 7.3: 1-9 (odd), 23, 25, 29, 39, 47, 49
Nov. 13	F	Review/Catch up	HW Completed: 7.4: 3, 8, 17, 21, 37, 43, 64
Nov. 16	M	Test: Chapter 7 (Section 1-4)	
Nov. 17	T	Review	Take-Home Test (Part 3) due
Nov. 18	W	Day of Rest	
Nov. 20	F	Theory Test	
Nov. 21, 23-24	Sat, M-T	Final Exams	