Ma 180 Applied Calculus

2022-2023 Second Semester

Instructor:	Dr. Laurel Carpenter
Office:	AL 46
Office Hours:	by appointment MTWF (see Appointment Scheduler in Canvas)
Preferred Contact:	llcarpen@bju.edu (also on Teams)
Textbooks:	Hughes-Hallett, Gleason, et al, *Applied Calculus*, 7th edition, Wiley 2022 ISBN 9781305860919
Calculator:	TI-83 Plus or TI-84 Plus graphing calculator

Catalog Description

A calculator based applied calculus course in one variable. Derivatives, integrals and their applications will be studied.

Course 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. This can be seen in the following link: https://protect.bju.edu/wiki/display/md/Goals+and+Objectives

The 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/her 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. Develop the basic mathematical and technical skills necessary to solve calculus-based problems. (DG 1, 2)
2. Gain an appreciation and understanding of the power of calculus as a tool to understand and deal with the world of change. (DG 1, 2)
3. Develop an understanding of the use and application of calculus to models developed for practical problems to enable the prediction of results and to allow for informed decision-making. (DG 1, 2, 4)

Course Objectives

The student will be able to

1. Establish limits of functions and develop the definition of the derivative as a limit that describes rates of change and behavior of functional relationships. CG1, CG2 (Assessed by Ch 1,2 tests)
2. Determine the derivatives and integrals of functions in both theoretical and applied contexts. CG1, CG2, CG3 (Assessed by Ch 2,3,4,5 tests)
3. Incorporate the appropriate use of technology to analyze problems connected to real-life applications. CG3 (Assessed by each test and both written projects)
4. Communicate both the stated problem and its solution in a clear and efficient manner. CG2, CG3 (Assessed by written projects)

COURSE EXPECTATIONS

Study Portfolio

Personal study is one of the primary means by which students develop good mathematical habits. Personal study includes pre-reading, note-taking, review, and practice. To encourage students to develop these personal study skills, they will be required to build a Study Portfolio for this course.

- Study Portfolios will be submitted at the beginning of class on test days.
- The Study Portfolio is to be submitted in a pocket folder with the students name easily visible on the front.
- The Study Portfolio will include the following pieces:
  - Study log – showing dates of study, daily hours of engagement, and study activities [3 pts]
  - Concept maps – per chapter and per unit showing connections among concepts covered [1-4 pts]
  - Exercise log – showing number of problems attempted, number checked, number correctly completed per section [1 pt]
  - Worked exercises -- see notes on organization below [1 pt]
  - Copies of discussion board posts and reflections
  - Copies of graded projects
  - All previously submitted study logs and exercise logs
  - All previously submitted (and revised as necessary) concept maps
- Worked exercises should be
  - neat and well organized with section numbers and page numbers appearing at the beginning of each new section
  - worked down the page in a single column
  - worked out in detail and should include the question, solution work, and final answer (marked correct)
  - checked by the student against the answers in the back of the book

Other Assignments

Other assignments may include worldview discussion posts and personal reflections.

- **Worldview Discussions** are specifically designed to engage students in considering cultural and biblical issues that influence our understanding of mathematics and its place in our lives. These discussions will appear at appropriate times throughout the semester and will be worth 5 to 7 points each.
- **Personal Reflections** are due on Saturday each week and are designed to encourage the student to consider how this course has impacted not only their knowledge and skills in mathematics but has also contributed to growth in their lives. These reflections are worth 3 points each.

Quizzes and Tests

Quizzes and tests serve different functions.

- Quizzes are to measure a student's understanding of and ability to use basic rules and skills just learned and measure retention of previously learned skills. Quizzes will typically…
    - contain short-answer, fill-in-the-blank, or multiple-choice questions
    - be graded without partial credit
    - be closed book, in class
- Tests are to measure a student's ability to perform multi-step problem-solving using the rules and skills learned cumulatively to that point in the course. Tests will typically…
    - contain multi-part problems based on application (word problems)
    - be graded with some consideration to partial credit (the process is as important as the answer)
    - be closed book, in class
- The Final Exam is to measure a student's overall ability to apply calculus in different scenarios. The final exam will…
    - contain multi-part problems based on application (word problems) as well as skill testing questions
    - be made up of multiple-choice and true/false type questions
    - be closed book, in class
    - be machine gradable (via GradeMaster)

Evaluation and Grading

The course grade will include at least the following…

- Study Portfolios: four units of assignments worth 7 to 12 points each
- Projects: written projects worth 50 points each
- Quizzes: Announced and unannounced quizzes worth 5 to 10 points each
- Unit Tests: three unit tests worth 50, 75, and 75 points respectively
- Final Exam: cumulative, worth 100 points

Final grades will be assigned according to the standard 10-point scale calculated out of the total points available during the semester. Final grade percentages will be calculated out of the total points available during the semester.

Name:	Range:	
A	100 %	to 93.0%
A-	< 93.0 %	to 90.0%
B+	< 90.0 %	to 87.0%
B	< 87.0 %	to 83.0%
B-	< 83.0 %	to 80.0%
C+	< 80.0 %	to 77.0%
C	< 77.0 %	to 73.0%
C-	< 73.0 %	to 70.0%
D	< 70.0 %	to 60.0%
F	< 60.0 %	to 0.0%

Late or Missing Assignments

- Students are expected to turn in assignments (projects and portfolios) on time and take quizzes and tests as scheduled for the class. Missing work will be given a grade of 0.
- Study Portfolios: Late portfolios may be turned in for 60% of their value during the "late work period" at the end of the semester.
- Quizzes: Missed quizzes for any reason will be given a grade of 0. The two lowest quiz scores will be dropped when final grades are calculated.
- Tests: One missed test may be made up only in extenuating circumstances with instructor approval and will be subject to 10% pts per day reduction of grade until one week has passed, after which it may not be made up and will retain a grade of 0.
- Students who are absent are personally responsible to obtain notes from fellow classmates.

Extra Credit

- There will be opportunity for extra credit during the semester. Once these opportunities have passed, no other extra credit work will be granted.

Classroom Decorum

The classroom is a professional environment. Students are expected to be respectful to their instructor and peers in behavior, attitude, attire, and use of technology. The instructor has the right to require students who are participating in distracting behavior to leave the class.

Other Policies

BJU **attendance** policy is in effect (see https://home.bju.edu/bju-policies/ for details).

- Personal absence allowance: 3
- Students who are having health issues whether chronic or acute are encouraged to contact Student Health Services at 864-241-1685.

Academic Honesty and Integrity Policy

BJU **academic honesty and integrity** policy is in effect (see https://home.bju.edu/bju-policies/ for details).

Changes to this syllabus may be made during the semester at the discretion of the instructor. Changes will be announced in class and/or posted on Canvas.

COURSE SCHEDULE

This schedule reflects the main flow of the semester; dates of lecture content are tentative and may shift slightly as the semester progresses. Adjust the pace of your homework assignments according to what is happening in lecture.

Schedule			
Date	Day	Class	Textbook sections
Jan. 11	W	Introduction to Calculus	
Jan. 13	F	Begin Unit 1: Functions and Change	Chapter 1 Sections 1.1-1.10
Jan. 16	M	**MLK Jr. Day no class**	
Jan. 18	W		
Jan. 20	F		
Jan. 23	M		
Jan. 25	W		
Jan. 27	F		
Jan. 30	M	**Unit 1 Test (50 points)**	
Feb. 1	W	Begin Unit 2: Derivatives and Rates of Change	Chapters 2 through 4 Sections 2.1-2.4, 3.1-3.5, 4.1-4.3, 4.7, 4.8
Feb. 3	F		
Feb. 6	M		
Feb. 8	W		
Feb. 10	F		
Feb. 13	M		
Feb. 15 – 17	W-F	**Bible Conference no classes**	
Feb. 20	M		
Feb. 22	W		
Feb. 24	F		
Feb. 27	M	**Unit 2 Test (75 points)**	
Mar. 1	W		
Mar. 3	F	**Project 1 (50 points)**	
Mar. 6	M	Begin Unit 3: Integration and Accumulated Change	Chapters 5 and 6 Sections 5.1-5.6, 6.1-6.3, 6.5 (6.6-6.7 ?)
Mar. 8	W		
Mar. 10	F		
Mar. 13	M		
Mar. 15	W		
Mar. 17	F		
Mar. 20-24		**Spring Break no classes**	
Mar. 27	M		
Mar. 28	W		
Mar. 30	F		
Apr. 3	M	**Unit 3 Test (75 points)**	
Apr. 5	W	Begin Unit 4: Modeling with Differential Equations	Chapter 9 Sections 9.1-9.7
Apr. 7	F		
Apr. 10	M		
Apr. 12	W	**University Service Day no class**	
Apr. 13	F		
Apr. 17	M		Additional material as time permits.
Apr. 19	W		
Apr. 21	F	**Project 2 (50 points)**	
Apr. 24	M		
Apr. 26	W		
Apr. 28	F		
May 1-4	M-Th	**Final Exams (100 points)**	