**BOB JONES UNIVERSITY**
BUILD FAITH. CHALLENGE POTENTIAL. FOLLOW CHRIST.

# Ma 130  Applied Calculus
## 2024-2025 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: | Neuhauser & Roper, *Calculus for Biology and Medicine*, 4th edition, Pearson 2018 |
| Calculator: | TI-83 Plus, TI-84 Plus graphing calculator (TI-89 or TI-NSpire also acceptable) |

### *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)


## Evaluation and Grading

The course grade will include at least the following…

|  | Point Value | Note |
|---|---|---|
| Weekly Reflections | 45 | 15 reflections @ 3 points each |
| Worldview Discussions | 20 | 4 discussions @ 5 points each |
| Application Activities | 20 | 4 activities @ 5 points each |
| Quizzes | 50-100 | 10-20 quizzes @ 5 points each |
| Tests | 200 | 4 tests @ 50 points each |
| Final Exam | 100 | 1 cumulative exam @ 100 points |
| **Total Point Value** | **435-485** |  |

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% |


## COURSE EXPECTATIONS


## Daily Expectations

- Bring your calculator to class every day and use it when working your exercises outside of class. Familiarity with this tool is crucial to success on tests.
- Work with me during class (Don't just copy what I do.  Think.)
- Seek help/clarification as soon as you are struggling (both in class and out of class).
- Work the corresponding homework after each lecture. (Don't let it pile up before the test.)
- Bring questions to class based on out of class work.


## Study and Exercise

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.  Create good proactive study techniques for yourself so you don't fall behind.

- Worked exercises and activities should be
  - neat and well organized with section numbers and page numbers appearing at the beginning of each new section

- o worked down the page in a single column
- o worked out in detail and should include the question, solution work, and final answer (marked correct)
- o checked by the student against the solutions (in the back of the text)

- **Application Scenarios** assigned per unit. Students are expected to turn in their solutions to these activities on the day of the unit test. Quality of work and communication will be evaluated.
- **Weekly Reflections:** Your study and exercise engagement with this class will be measured by Weekly Reflections in Canvas. On occasion, exercises will be requested to be turned so the quality of your work can be evaluated. You should stay up to date on your exercise work so you will be ready for these requests.

### *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…
  - o contain short-answer, fill-in-the-blank, or multiple-choice questions
  - o be graded without partial credit
  - o 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…
  - o contain multi-part problems based on application (word problems)
  - o be graded with some consideration to partial credit (the process is as important as the answer)
  - o be closed book, in class, (may be via Canvas)
- The Final Exam is to measure a student's overall ability to apply calculus in different scenarios. The final exam will…
  - o contain multi-part problems based on application (word problems) as well as skill testing questions
  - o be made up of multiple-choice and true/false type questions
  - o be closed book, in class
  - o be administered via Canvas

OTHER POLICIES

**Late or Missing Assessments:**
- ▪ **Permission:** A student wishing to receive credit for a late assignment must seek the permission of their instructor.
- ▪ **Late Penalty:** Unless otherwise stated below, late assessments in this course will be penalized ($n \cdot 10$) percentage points per day if taken within three calendar days starting at the time the assignment is due where $n$ is the number of times a late penalty has been granted. After which, the grade will be zero.
- ▪ Missing work will receive a grade of zero.
- ▪ Weekly Reflections will not be accepted late. Any student may request that one weekly reflection during the semester be excused without penalty for any reason.
- ▪ Application Scenario Activities may be turned in after the due date only with the instructor's permission and will incur the late penalty.
- ▪ Quizzes and Tests missed due to absence may be made up only with the instructor's permission and will incur the late penalty. In extenuating circumstances, the late penalty may be waived.
- ▪ The Final Exam, may be made up only with the Registrar's permission.

**Classroom Deportment**

All meetings are to be conducted in a professional manner. That means, while in attendance students are expected to focus on course-related material and to contribute positively to the meeting. The instructor reserves the right to ask a student to leave a meeting should their attention be elsewhere (sleeping, surfing the internet, working on assignments for another class, etc.). Professionalism includes the attitudes being conveyed. Respect is to be shown towards all in attendance. Discourse should be gracious. Critique and inquiry is to be collegial – given and received with humility, fairness, and an open-mind.

**Absences:**

Missed meetings will be counted as course absences. Arriving late or leaving early from a meeting will count as a partial absence. The University's attendance policy is in effect.
(See https://home.bju.edu/bju-policies/ for details.)

**Academic Integrity and Artificial Intelligence Policies:**

The University's Academic Integrity Policy is in effect. (See https://home.bju.edu/bju-policies/ for more details).

- **Artificial Intelligence:** Because the goal of the assignments in this course is to develop skills rather than simply to complete tasks, and because the use of AI to complete or jump-start tasks defeats that goal, students may not use generative AI tools (i.e. Chat GPT, Bing Chat, Google Bard, etc.) in this course for any assignment without the instructor's explicit permission. Should an AI tool be used with permission, its use must be documented (including the tool used, a summary of the prompts provided and the portions of the assignment that were based on AI generated work).
- **Cheating and Plagiarism:** Cheating is defined as any use of unauthorized helps. Plagiarism is defined as taking someone else's words and/or ideas and claiming them as one's own. All work done for this course must be independent and original. If information is taken from other sources (which is at times appropriate), it must be adequately cited so credit is given to whom it is due. Use standard referencing techniques as taught in En 102.
- **Originality:** Students are permitted (and encouraged) to discuss the ideas of their research but are not permitted to collaborate with anyone other than their instructor on graded assignments unless working on a collaborative effort under the explicit direction of the instructor. In which case, the instructor will determine which assignments may be worked on and submitted jointly. Graded assignments should represent the student's own ideas and their own work and should be the product of their own thinking and efforts. A student may not use AI to generate any portion of their papers or presentations without explicit permission from their instructor (and if permission is granted it must be documented as described above).
- **Ask Your Instructor:** If you have a question about any source you are considering using, please gain your instructor's approval before using it. You are always permitted to ask your instructor for help. Any help they choose to provide is acceptable.

**University Policies:** We will follow University guidelines.

**Copyright Policy:**

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