

Ma 136  
**Calculus II**  
*Fall/2024*

Instructor:	James A. Knisely, Ph.D.
Office:	Alumni 64
Office Hours:	MWF 8:00 – 8:50 a.m.   Tu 1:30 – 2:45 p.m.   Th 8:00 – 9:15 a.m. Please email or text to confirm availability
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Communication Policy:	Feel free to email or contact me via Microsoft Teams for questions and/or extended help. You may text where appropriate (not during class).
Classroom:	AL 301
Meeting:	MWF 1:00 - 1:50 p.m.   Tue 12:30 - 1:20
Credit/Load:	4/4
Textbook(s):	<i>Calculus</i> 11th ed. by Larson/Hostetler/Edwards

**Catalog Description:**

A continuation of Ma 135. Topics include definite integration, differentiation and integration of transcendental functions and other algebraic curves, and applications.

**Calculator Requirements:**

TI-89 or TI-Nspire CAS calculator required

**Prerequisites:**

At least a grade of C in MA 136, Calculus I

**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. 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. To develop a Christian perspective of Calculus and related scientific endeavor (DG 4, 5)
2. To develop Christ like qualities such as perseverance, diligence, and dependence on God. (DG 3, 4)
3. To develop mathematical maturity and independent thinking (DG 1)
4. To develop a greater appreciation for the beauty and power of Calculus (DG 1, 3)
5. To develop a greater interest in exploring mathematical ideas independent of the teacher (DG 1, 3)
6. To prove the basic theory of Integral Calculus (DG 1, 2, 3)
7. To develop mathematical modeling and problem solving skills with the power of Calculus tools (DG 2)
8. To develop skill and techniques of differentiation and integration--the basic computations of calculus (DG 2, 3)
9. To develop the ability to present mathematics in written and oral form(DG 5)

**Course Objectives:**

With at least 70% accuracy, the student will be able to do the following:

Course Objectives	Course Goals Supported	Course Content (Chapter(s))	Primary Assessment
A. Graph, integrate and differentiate rational expressions, the trigonometric functions, their inverses, the logarithmic function, and the exponential function. (NCTM A.5.1)*	2, 7, 8	5, 8	Tests
B. Write the definitions of all terms and concepts of Integral Calculus (NCTM A.5.1)	3, 6	5, 8	Tests
C. Prove certain important theorems of Calculus, like the Extended Mean Value Theorem, and L'Hopital's Theorem, Taylors' Remainder Thm. (NCTM A.5.1)	2, 3, 4, 6	8, 9	Theory Test/Test
D. Use numerical integration techniques to estimate the value of a definite integral. (NCTM A.5.1)	7, 8	4	Test
E. Determine the convergence of infinite series and approximate the sum of those series which converge	1, 4	9	Test
F. Use calculator and computer simulated graphics as well as physical models to discuss calculus concepts. (NCTM A.5.6)	5, 7	4, 7	Tests
G. Relate geometric concepts to finding the area between curves, volumes and surface areas of solids of rotation, and arc length in both parametric and polar form (NCTM, A.5.5)	3, 4, 7, 8	10	Test/Paper
H. Solve Calculus problems related to real-world applications. (NCTM A.5.5, A.5.6)	7, 8	10	Test
I. Use a graphing calculator to solve Calculus problems. (NCTM A.5.6)	3, 7	5, 8, 9, 10	Tests
J. Present a theorem with proof and application to the class.	9	5,8,9,10	Presentation

### Course Content:

1. Theory and applications of the Calculus of transcendental functions; Logarithmic and exponential functions, Trigonometric and inverse trigonometric functions
2. Inverse functions and relations, one-to-one functions, natural logarithmic function, natural exponential function, derivatives and integrals, and growth and decay. Natural logarithms and differentiation, Natural logarithms and integration, Exponential functions- differentiation and integration, Exponential functions with bases other than e, Inverse trigonometric functions - differentiation and integration,
3. Definition of the Limits at infinity, Extended Mean Value Theorem and L'Hopital's Theorem, Theory and applications of Improper integrals, Integrals involving infinite intervals and discontinuous, unbounded integrals.
4. Theory and applications of infinite series. Representing functions with power series. Determine convergence, bounds on limits.
5. Equations and graphs of conics and rotations in space.
6. Representing functions in parametric and polar forms
7. Technology in calculus: Use of a graphing calculator to graph in parametric and polar form. Use a CAS calculator to find derivatives of equation in polar and parametric form and to find power series representations of functions.

### Course Readings:

Textbook should be read thoroughly. Students are responsible for all of the information in the textbook even if not discussed in class. The following website will come in handy in a variety of ways. You will find help, graphics, and practice tests among other interesting and helpful information. [Resource](#)

### Grading Scale:

Standard 10 point scale

### Grade:

Two tests are scheduled for each of chapters 5, 8, 9, and 10. The point totals for the tests of each chapter will range from 140 to 160 points. The homework for each section will be worth 2 points giving 12 to 20 points per chapter depending on the chapter. Additionally, the final exam will be cumulative.

### Homework:

- Homework must be neat and well organized. Section numbers should appear at the beginning of each new section.
- Homework should be worked out in detail. Answers alone are not acceptable.
- You are responsible for checking all of your homework problems from the answers in the back of the book. Complete

Solutions Guides are on reserve in the library at the check-out desk.

- Bring your completed homework for the current chapter to class every day. Up to two times during a chapter (no later than test day), homework will be collected and graded for completeness. This will not be announced ahead of time. To be sure to get homework credit, you must have homework completed by the due date on the schedule.
- All homework must be neatly presented. This includes neatly written work and neat pages (no wrinkles, little edges from a spiral notebook, etc.).
- Any homework assignment not following the above guidelines, may be returned to the student ungraded and will receive a 0 until the assignment is resubmitted in accordance with these guidelines.
- In almost all problems you can use the calculator to check your work, but remember I may/will not allow the calculator on the quiz/test so you should be able to do most of the problems without the aid of a calculator.

### **Policy Regarding Students with Disabilities:**

Bob Jones University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. Please let me know within the first week of class if you have a documented learning disability or condition that may impair your ability to complete this course successfully. Also, I would appreciate your letting me know if you are receiving help through the BJU Center for Learning and Academic Services this semester, or if you feel you need additional academic support. I am happy to help you access the various academic resources available here on our campus. Please also let me know about any serious medical condition that may hinder your learning this semester or may require specific medical care in case of an emergency.

### **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.

### **Academic Penalty for Absences:**

We will follow the University approved absentee policy for this semester. If you miss because of sickness or because you were put into isolation, then notify me at once (beforehand if possible). Participate by doing the homework and listen to the Panapto videos. Participate in your study groups and be talking to me via teams.

### **Cheating:**

Cheating is defined as any use of unauthorized helps. In today's age of technology, this includes getting unapproved help from a source on the internet and/or using your calculator to store formulas or information that you are to know from memory. The use of AI or the web may be helpful while doing homework. However, document your sources for both your benefit and so I can see what you are using to learn.

If you have a question about any source you are considering using, please gain teacher approval before using it. The presence of any material on your desk containing formulas, notes, etc. (except for those allowed by the instructor) while taking a test, will be construed as cheating and will be dealt with as such. Cheating on a test may result in a zero on the test plus any penalties imposed by the discipline committee. You may not work together on take-home questions. You may work together on your homework.

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### **Additional Document(s)**

- [Lecture schedule](#)