Instructor:

Dr. Chris Lee   Trexler 270D
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Office Hours:

Mon/Wed: 1:00 – 2:00 pm
Tue/Thu: 3:00 – 4:00pm
Other times by appointment

Course Meetings

Mondays, Wednesdays, and Fridays: 9:40 – 10:40am
Thursday: 8:30am - 10:00am lab, Trexler 374

Course Information

This course provides a continuation of the study of calculus. Topics to be studied include more applications of the definite integral, sequences and series and applications of them, and vectors and functions of several variables.

Intended Learning Outcomes

By the end of this course, students will be able to:

- Apply the theory of differentiation and integration to model and solve real-world problems.
- Recognize a differential equation and be able to both solve basic differential equations and discuss what a differential equations tells you about the process it models.
- Determine the behavior of infinite series and understand the role of power series and Taylor series in modern mathematics.
- Utilize vectors in two-dimensional and higher-dimensional coordinate systems to model graphs and equations, and apply methods of Calculus to these graphs and equations.
- Recognize the role of technology in Calculus, understand when it should be used, and be aware of its limitations.

Required Materials

Textbook   *Calculus: Early Transcendental Functions*; Smith and Minton, 4th Edition
Suggested   Laptop

Prerequisite

Math 121 Calculus I or equivalent.

Course Grades

The following table lists the weights for the various forms of assessment for this course

Participation / Attendance / HW / Quizzes	20%
Labs	15%
Tests	45%
Final Exam	20%

A grade scale will be determined after final averages are computed, but will be no worse than the scale given below.

0	60	63	67	70	73	77	80	83	87	90	93
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

Reading and Participation

The key to learning a topic in mathematics is reading and participation. We will strive to have an active, rather than passive, classroom environment. The last page of the syllabus is a day-by-day outline of the sections that will be discussed in class. You are fully expected to have read the upcoming section before the class meeting! This does not mean you need to understand everything, but rather you should be familiar with the definitions and concepts from the sections.

Attendance
Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. Unexcused absences may result in the lowering of the final grade. I will assume that if you accumulate 3 unexcused absences you are not interested in completing the course and will drop you from the class (DF). When absent, excused or unexcused, you are responsible for all material covered in class. You will not be allowed to make up any work missed due to an unexcused absence.

MCSP Conversations
The Department of Math, Computer Science and Physics offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline. Members of this class are invited be involved with all of these meetings; however participation in at least two of these sessions is mandatory. After attending, students will submit within one week of the presentation a one page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience.

Labs
The mathematics we will be learning has a large number of applications which we will explore during weekly technology labs. Most of our labs will be done using the Mathematica computer algebra system and will last 1.5 hours and typically require a problem set or lab write-up. The labs will be graded using a portfolio system. The first group of four labs will be marked up with comments and suggestions, but no numerical grade will be assigned. Then, you will pick one of the four labs to re-work, addressing suggestions and showing your best work. This will be graded. This process will then be repeated for the second set of four labs.

Tests & Final Exam
Four tests will be given as shown on the attached schedule. Each test will focus on the material learned since the last test, but as with most mathematics classes, the exam will necessarily require you to understand and remember things from the past. The final exam will be cumulative, equally covering all material presented in the course.

The Office of Disability Support Services, located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library, provides reasonable accommodations to students with identified disabilities. Reasonable accommodations are provided based on the diagnosed disability and the recommendations of the professional evaluator. In order to be considered for disability services, students must identify themselves to the Office of Disability Support Services. Students requesting accommodations are required to provide specific current documentation of their disabilities. Please contact Dr. Bill Tenbrunsel, Director of the Center for Learning & Teaching, at 540-375-2247 or e-mail tenbruns@roanoke.edu.
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If you are on record with the College's Office of Disability Support Services as having academic or physical needs requiring accommodations, please schedule an appointment with Dr. Tenbrunsel as soon as possible. You need to discuss your accommodations with him before they can be implemented. Also, please note that arrangements for extended time on exams, testing, and quizzes in a distraction-reduced environment must be made with the Center for Learning & Teaching at least 2 business days (M-F) *before every exam*.

Academic Integrity
Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No electronic devices other than an approved calculator, laptop, or iClicker can be taken out during any class. During periods of testing, only Mathematica will be allowed unless otherwise announced.

Cell Phones: This is very simple - no cells phones are allowed to be used or even visible in our classroom. This includes before, during, and after class. If a cell phone is seen, the student will be asked to leave the classroom and the day will be counted as an unexcused absence.

Course Schedule - This course expects you to spend at least 12 hours of work each week inside and outside of class.

Mon	Jan 18		Intro
Wed		7.1	Modeling with differential equations
Thu			**Lab 1**: Differential Equations
Fri		7.2	Separable differential equations
Mon	Jan 25	5.5	Projectile Motion
Wed		5.7	Probability
Thu			**Lab 2**: Projectile Motion
Fri		8.1	Sequences of real numbers
Mon	Feb 1	8.2	Infinite series
Wed		8.3	The integral, comparison, and limit comparison tests
Thu			**Lab 3**: Golden Calculations
Fri		8.3	The integral, comparison, and limit comparison tests
Mon	Feb 8	8.4	Alternating series
Wed			Review
Thu			**Test 1**
Fri		8.5	Absolute convergence, the ratio test
Mon	Feb 15	8.5	Absolute convergence, the ratio test
Wed		8.6	Power series
Thu			**Lab 4**: Series
Fri		8.6	Power series
Mon	Feb 22	8.7	Taylor series
Wed		8.7	Taylor series
Thu			**Lab 5**: Graphical Power Series
Fri		8.8	Applications of Taylor series
Mon	Feb 29		"What is Mathematics" day
Wed			Review
Thu			**Test 2**
Fri		10.1	Vectors in the plane
Spring Break			
Mon	Mar 14	10.2	Vectors in space
Wed		10.3	The dot product
Thu			**Lab 6**: Vectors and Geometry
Fri		10.4	The cross product
Mon	Mar 21	10.5	Lines and planes in space
Wed		10.6	Surfaces in space
Thu			**Lab 7**: Curved Cube
Fri		11.1	Vector-valued functions
Mon	Mar 28	11.2	The calculus of vector-valued functions
Wed			Review
Thu			**Test 3**
Fri		11.3	Motion in space
Mon	Apr 4	11.4	Curvature
Wed		12.1	Functions of several variables
Thu			**Lab 8**: Gorilla Golf
Fri			*Good Friday, no classes*
Mon	Apr 11	12.2	Limits and Continuity
Wed		12.3	Partial derivatives
Thu			**Lab 9**: Three-D
Fri		12.4	Tangent planes and linear approximations
Mon	Apr 18	12.6	The Gradient and Directional Derivatives
Wed			Review
Thu			**Test 4**
Fri		12.7	Extrema of Functions of Several Variables
Mon	Apr 25		Review for final exam
Thu	Apr 28		**Final Exam**, 2 – 5pm