Instructor: David Kerr  
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Office: Milner Hall 121  
Office hours: TR 2:30–4:00 or by appointment  
Phone: 862-3458  
Lectures: TR 9:35–10:50, Heldenfels 113  


Course description: This course will cover vectors in two dimensions, differentiation and integration of functions of one variable, and applications such as work, velocity/acceleration, optimization (max/min), and curve sketching. The course meets twice per week in lecture and twice per week in recitation. One of your recitation meetings is designed to discuss questions concerning the homework or lectures. The other recitation meets in the computer laboratory where the computer package Matlab will be introduced. The goal of the laboratory portion of the course is to show how problems that are too difficult to solve hand can be solved with the help of the computer. The prerequisite for this course is either Math 150 (precalculus) or a good high school mathematics background that includes algebra II, analytic geometry and trigonometry.

Weekly schedule:

1. Introduction, trigonometry review, two-dimensional vectors (Appendix D, Section 1.1)  
2. Dot product, parameterized curves, (qualitative) definition of limit (Sections 1.2–1.3, 2.2)  
3. Calculation of limits, limits at infinity, continuity (Sections 2.3, 2.5–2.6)  
4. Velocity, differentiation (Sections 2.7, 3.1–3.2)  
5. Rates of change, derivatives of the trigonometric functions (Sections 3.3–3.4)  
6. Chain rule, implicit differentiation, derivatives of vector-valued functions (Sections 3.5–3.7)  
7. Higher derivatives, tangents of parameterized curves, related rates (Sections 3.8–3.10)  
8. Differentials and approximation, exponential and inverse functions (Sections 3.11, 4.1–4.2)  
9. Logarithmic functions, derivatives of logarithms (Sections 4.3–4.4)  
10. Exponential growth and decay, inverse trigonometric functions, L’Hospital’s rule (Sections 4.5–4.6, 4.8)  
11. Graphical interpretation of the derivative, first and second derivative tests (Sections 5.1–5.3)  
12. Applied max/min, antiderivatives, Riemann sums (Sections 5.5, 5.7, 6.1)  
13. Area and the definite integral (Sections 6.2–6.3)  
14. Fundamental theorem of calculus (Section 6.4)  
15. Review for the final exam
Learning objectives: The aim is to provide students with quantitative and problem-solving skills in the subjects of two-dimensional vectors and differential calculus. At the conclusion of the course, students should be able to (i) know and use techniques of limits and differentiation, (ii) apply techniques of differentiation to a variety of applications, including engineering applications, (iii) understand and apply vector operations in two dimensions, including the dot product, (iv) understand the relationship between derivatives and integrals via the Fundamental Theorem of Calculus, and (v) use computer algebra systems such as Matlab to solve applied problems.

Grading: Grades will be determined by three exams (weighted evenly and together worth 50%), a cumulative final exam (25%), and a laboratory grade (25%). The lab grade will be determined by quizzes (40%), Matlab assignments (40%), and online assignments (20%). Letter grades will be determined in the standard way: A: 90–100, B: 80–89, C: 70–79, D: 60–69, F: 0–59. The three exams are common and are administered in the evening from 7:30 to 9:30 p.m. The final exam will be held from 12:30 to 2:30 p.m. on Friday December 10.

Make-up policy: In accordance with university regulations, make-ups for missed exams and assignments will only be allowed for a university-approved excuse in writing. Whenever possible, students should inform the instructor before an exam or assignment is missed. Students are required to notify the instructor by the end of the next working day after missing an exam or assignment. Otherwise, they forfeit their rights to a make-up.

Support services: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.


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