

# MAT 226: Vector Calculus Syllabus

**MAT176 Calculus II:** 4 hours, 4 credits. Vectors in two and three dimensions, equations of lines and planes, functions of several variables, partial differentiation, directional derivatives, gradients, optimization with Lagrange multipliers, multiple integration, line integrals, and vector fields.

**Prerequisite:** A grade of C (or better) in MAT 176 or placement by the department.

**Instructor:** Your instructor will provide contact info, office hours and meeting times for your section.

## Grading Policy

**Expectations:** Students are expected to learn both the mathematics covered in class and the mathematics in the textbook and other assigned reading. Completing homework is part of the learning experience. Students should review topics from prior courses as needed using old notes and books.

**Homework:** Approximately four hours of homework will be assigned in each lesson as well as additional review assignments over weekends.

**Exams:** There will be regular quizzes, two midterms and a final exam during finals week. Students who do not pass the departmental final exam will not pass the course.

**Grades:** The precise grading policy for your section will be distributed by your instructor.

## Materials, Resources and Accommodating Disabilities

**Textbook:** Briggs, et al. Calculus Early Transcendentals. (Custom Lehman Edition.) Consult with your instructor before purchasing anything, MyLab access may be required.

**Tutoring:** Departmental tutoring is available in Gillet Hall 233. For updated information please visit the following website (<http://www.lehman.edu/academics/math-lab.php>)

**Reliable Web Resources:** See <https://www.lehman.edu/mathematics/calculus.php>

**Accommodating Disabilities:** Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services. For more info, please contact the Office of Student Disability Services, Shuster Hall, Room 238, phone number, 718-960-8441.

## Course Objectives

At the end of the course students should be able to:

1. Graph/determine equations for lines and planes (as part of dept objectives a & b)
2. Compute sums, differences, dot/cross products of vectors (a)
3. Determine velocities/accelerations of vector-values functions (a, b, & c)
4. Find level sets, gradients, and tangent planes to functions of several variables (a, b, & e)
5. Apply the method of Lagrange Multipliers (a, b, & c)
6. Apply Fubini's Theorem and Green's Theorem to integrate functions and function fields (a, b, & e)

*These objectives will be assessed on the final exam along with other important techniques.*

## Course Calendar

- Lesson 1:** Vectors in 2D and 3D (Sections 13.1, 13.2)
- Lesson 2:** Dot and Cross Products (13.3, 13.4)
- Lesson 3:** Parametric Equations and Polar Coordinates (12.1, 12.2)
- Lesson 4:** Lines and Planes (13.5)
- Lesson 5:** Cylinders and Quadric Surfaces (13.6)
- Lesson 6:** Cylindrical and Spherical Coordinates (16.5)
- Lesson 7:** Vector Valued Functions, Limits, and Continuity (14.1)
- Lesson 8:** Calculus of Vector Valued Functions (14.2)
- Lesson 9:** Motion in Space (14.4)
- Lesson 10:** Tangent Vectors and Arc Length (14.5, 14.6)
- Lesson 11: Review for Exam I**
- Lesson 12: Exam I**

*Students who do poorly on this exam should consider dropping this course and attending a class on precalculus before taking calculus. Please consult with your professor or math advisor for more personalized advice. Bring your exam and homework with you when seeking advice.*

- Lesson 13:** Functions of Several Variables and Level Sets (15.1)
  - Lesson 14:** Partial Derivatives (15.3)
  - Lesson 15:** Chain Rule, Directional Derivative, Gradient (15.4, 15.5)
  - Lesson 16:** Tangent Planes (15.6)
  - Lesson 17:** Maxima/Minima (15.7)
  - Lesson 18:** Lagrange Multipliers (15.8)
  - Lesson 19:** Additional Day For Optimization
  - Lesson 20: Review For Exam II**
  - Lesson 21: Exam II**
- Review all prior homework problems.

- Lesson 22:** Double Integrals (14.1, 14.2)
- Lesson 23:** Change of Variables To Polar and General (16.3, 16.7)
- Lesson 24:** More Integration (16.4)
- Lesson 25:** Vector Fields (17.1)
- Lesson 26:** Line Integrals and Conservative Vector Fields (17.3)
- Lesson 27:** Green's Theorem (17.4)
- Lesson 28:** Review for the final exam

**Final Exam:** The Final Exam will be given during Finals Week covering the entire course especially topics needed in future courses.

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