MTH255 - Vector Calculus

Winter 2021

Instructor:	Dionysus Birnbaum	**Time:**	MTWF 11:00 – 12:00
Email:	birnbad@linnbenton.edu	**Place:**	Virtual (Zoom)

Course Pages:

1. MyOpenMath
   (a) Enrollment key: mth255winter2021
   (b) Course ID: 96327
2. Zoom link to lectures: `https://linnbenton.zoom.us/j/96946013979`
3. Personal Zoom link for office hours: `https://linnbenton.zoom.us/j/2125666553`

Office Hours: R11:00-12:00, WF12:00-13:00, and by appointment.

Textbook: We will be using an open source textbook, available at the following link. OpenStax Calculus Volume 3

Overview: An intermediate treatment of multivariate calculus with a vector approach. Provides the mathematical skills for courses in advanced calculus, fluid mechanics and electromagnetic theory.

Outcomes: Upon successful completion of this course, students will be able to: Develop a unifying thread throughout the major topics in the course starting with the vector differential. Construct and evaluate line integrals and surface integrals. Develop an analytic and geometric understanding of the gradient and of conservative vector fields, and their relationship to each other. Develop an analytic and geometric understanding of curl and divergence, including their relationship to circulation and flux. Develop an analytic and geometric understanding of the Divergence Theorem and of Stokes' Theorem.

Prerequisites: MTH 254 Multivariable Calculus with a grade of C or better.

Grading Policy: Online MyOpenMath Homework (30%), In-Class Activities (20%), Midterm (20%), Final (30%). Letter grades will be assigned based on the standard scale of $A : 90\% - 100\%$, $B : 80\% - 89\%$, $C : 70\% - 79\%$, $D : 60\% - 69\%$, $F : 59\%$ or below.

Online Homework Policy: Completing the homework in a timely manner is critical to your success in this class. Homework is your opportunity to practice and deepen your understanding of the concepts we covered in class. Homework will be completed online in MyOpenMath. MyOpenMath is free, open-source online homework and includes access to the textbook we will be using for this class.

ALL of the online homework is available from the start of the term, with no set due date; it is your responsibility (and privilege!) to set the pace at which you work through the homework. It is recommended that you complete each week's homework by, approximately, the Wednesday of the following week.

In-Class Activities: Monday and Tuesday class periods will be lecture sessions. Each Wednesday class will be spent on collaborative, small group activities, to practice the material from the Monday and Tuesday lectures. These activities consist of various written problems, to be completed, scanned, and uploaded by Friday at midnight, whether or not we finish the assignment during class. If you would prefer to write on blank paper and upload it, that is fine too. Additionally, if you would like to to typeset your response in

LaTeX (or similar) the .tex files are included. Unlike the homework, this is a set due date, so I can (1) check that people are keeping pace with the material myself, and (2) so I can manually grade the written material in a timely fashion. The keys to these activities will post Friday at midnight. Friday class periods are your opportunity to ask any last questions you might have on the activities or homework, with any other time used for lecture or various catch-up, as needed.

Tests: In this class, we will have two exams: a midterm and a cumulative final. Each exam will consist of two parts: a timed, online portion, served through MyOpenMath (very similar to a homework assignment) and a take-home, written portion to be uploaded to MyOpenMath.

If you must miss a test, you are required **to contact your instructor in advance** of the testing time. Alternate arrangements may be made in the case of extreme circumstances beyond the student's control and will be at the discretion of the instructure. If you miss an exam, you will receive a zero for that exam, there are no retests or make-up exams.

Important Dates:

Midterm ..... Feb. 12, 2021
Final Exam ..... Mar. 17, 2021

What can you do to be successful in this class?

Attend class: There is a strong link between good attendance and success in math courses. Attending class is more than just showing up, it is also means that you participate in the class discussions and activities.

Complete your homework in a timely manner: Homework is your opportunity to practice; math is not a spectator sport! The material in MTH255 is *not* something you can passively absorb; you have to work through it. You deserve a certain degree of flexibility in completing the work so there are no set due dates, but it is best to be working through each homework assignment during the week it is assigned.

Get help: If you have questions, PLEASE come see me and ask. I have scheduled office hours, but you are always welcome to e-mail me for additional time. I try to respond within 24 business hours; if I haven't, feel free to send a follow-up. Visit the resources section of MyOpenMath for helpful links, class notes, and other information.

Check out the online notes: Lectures will be recorded and posted in their corresponding section of MyOpenMath.

Form a study group: Your classmates are important resources for understanding and completing the homework. Often a fellow student can explain things in a different way than your instructor. You gain a deeper understanding of mathematical concepts when you express them in your own words and explain them to someone else. It is strongly recommended that you study together with other students in small groups.

Class Policies

Attendance: Your regular attendance and thoughtful participation in class are essential for your success in learning calculus. If you are unable to attend class, please let your instructor know ahead of time either in person or by email. Students are responsible for any material, updates, or other information covered during class. In addition, students should expect to log into MyOpenMath several times each week to check for announcements, study course materials, and complete online homework.

Special circumstances or accommodations: You should meet with your instructor during the first week of class if:

- You have a documented disability and need accommodations.

- Your instructor needs to know medical information about you.
- You need special arrangements in the event of an emergency.

If you have documented your disability, remember that you must make your request for accommodations through the Center for Accessibility Resources (CFAR) Online Services webpage every term in order to receive accommodations. If you believe you may need accommodations but are not registered with CFAR¡ please vist the CFAR website for steps on how to apply for services or call (541) 917-4789.

Basic needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Roadrunner Resource Center for support at 541-917-4877, or schedule an appointment on the web at www.linnbenton.edu/rrc . Our office can help students get connected to resources to help. Furthermore, please notify the instructor if you are comfortable in doing so. This will enable them to provide any resources that they may possess.

LBCC Comprehensive Statement of Nondiscrimination: LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws.

Statement of Incusion: The LBCC community is enriched by diversity. Each individual has worth and makes contributions to create that diversity at the college. Everyone has the right to think, learn, and work together in an environment of respect, tolerance, and goodwill.

Academic Honesty: I assume that you are ethical and honest. However, if there is an incident of academic dishonesty (cheating), you will receive a score of zero for that test/assignment and the incident will be reported to the college administration for possible further disciplinary action. If there is a second offense, you will receive a grade of F for the course and the incident will be reported to the college administration with a recommendation for disciplinary action.

Tentative Course Outline

1. Week 1 (Jan. 4 - Jan. 8): MTH254 Review
2. Week 2 (Jan. 11 - Jan. 15): Vector Fields; Chapter 6.1
3. Week 3 (Jan. 18 - Jan. 22): Line Integrals; Chapter 6.2
4. Week 4 (Jan. 25 - Jan. 29): Line Integrals, cont.; Chapter 6.2. Conservative Fields; Chapter 6.3
5. Week 5 (Feb. 1 - Feb. 5): Green's Theorem; Chapter 6.4
6. Week 6 (Feb. 8 - Feb. 12): Divergence and Curl; Chapter 6.5. Midterm; Chapters 6.1-6.4
7. Week 7 (Feb. 15 - Feb. 19): Surface Integrals; Chapter 6.6
8. Week 8 (Feb. 22 - Feb. 26): Surface Integrals, cont.; Chapter 6.6. Stokes' Theorem; Chapter 6.7
9. Week 9 (Mar. 1 - Mar. 5): Stokes' Theorem, cont.; Chapter 6.7. Divergence Theorem; Chapter 6.8
10. Week 10 (Mar. 8 - Mar. 12): Divergence Theorem and Applications; Chapter 6.8
11. Finals Week (Mar. 15 - Mar. 19): Final; Cumulative, but emphasizing Chapters 6.5-6.8