

**Lamar University**  
**Fall 2017**  
**Math 3435-01      Calculus III**

**Instructor:** Dr. Wen Liu

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**Office hours:** MWR 1:30-2:30pm, or by prior appointment

**Class Time and Location:** MWRF 8:00-8:55am, Social Behavioral Sciences 104

**Prerequisites:** Grade of "C" or better in MATH 2414 or its equivalent.

**Textbook:** *Calculus: Early Transcendental Functions*, 6<sup>th</sup> ed, by Ron Larson and Bruce H. Edwards

**Course Description:**

- ❖ Credit: 4.
- ❖ Functions of several variables, partial derivatives, vector functions, multiple integrals in different coordinate systems, line and surface integrals of both functions and vector fields, some basic 1st and 2nd order differential equations.
- ❖ Prepares for: MATH 4302, 4310.

**Learning Outcomes:** Upon completion of this course, students will:

1. Perform calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion.
2. Perform calculus operations on functions of several variables, including partial derivatives, directional derivatives, and multiple integrals.
3. Find extrema and tangent planes.
4. Solve problems using the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem.
5. Apply the computational and conceptual principles of calculus to the solutions of real-world problems.
6. Convert and graph basic equations in Cartesian, cylindrical, or spherical coordinates.
7. Describe 3-D motion using vector functions.
8. Compute limits of functions of several variables.
9. Apply the chain rule to finding derivatives.
10. Apply Lagrange Multipliers to find extrema subject to constraints.
11. Change variables in multiple integrals.
12. Define a vector field and sketch a simple vector field.
13. Compute a line integral with respect to arc length,  $x$ ,  $y$ , and  $z$ .
14. Compute a line integral over a vector field.

15. Identify a conservative vector field and compute a potential function for a conservative vector field.
16. Parameterize a surface.

**Core Curriculum Outcomes:** Upon completion of this course, the student will demonstrate his or her abilities to think critically, communicate quantitative information, and apply mathematical concepts:

1. **Critical Thinking:** Develop a logical, consistent plan to solve a problem, recognize consequences of the solution, and articulate a reason for choosing solution method.
2. **Communication Skills:** Use and present quantitative information in connection with an argument or problem solution and explicate it in an effective format.
3. **Empirical and Quantitative:** Construct and present a detailed problem statement with evidence of relevant contextual factors and possible approaches for solving the problem, then implement a solution and review the results.

### **Grading Policy:**

- ❖ The course grading will be based on the results of

**Attendance:** All students are expected to attend each class meeting. If you must miss a class for any reason, you are responsible for any material discussed during that session. No make-up exams will be given unless there are extraordinary circumstances, as the final gives students the opportunity to be tested on the material and replace a missed exam. If, for some reason, you miss multiple exams, a make-up will only be given in the event that each absence is determined to be excusable. It is essential that you notify me in advance if you must miss an exam, especially if you have already missed one previously. Failure to do so will result in a score of 0 for the exam.

**Other:** You do not need to ask permission to leave class for personal reasons, just do your best to avoid causing any disruption on your way out. No computers, cell phones, or calculators are permitted unless otherwise indicated; furthermore, use during exams constitutes academic dishonesty unless otherwise specified. If there is an exam being administered, no student may begin testing after another student has turned in the exam, and you must turn in your exam before leaving or you will receive a score of 0.

**Homework/In-class Assignment:** Homework/in-class assignment is due at the start of class. Late work will not be accepted. Student presentations are an important part of our learning process in mathematics, and dedicated preparation in your assignments is essential to your success. Each week, students will give presentations based on the assignments. Everybody must present some of their work during the semester; otherwise, you forfeit that portion of your grade.

**Exams:** If you use calculators/cell phones, you will receive a zero. You must bring your student ID or driver's license to the exams. After entering the classroom on exam days, you will not be allowed to leave until you turn your exam in.

**Make-up Exams:** Make-up exams will not be given. It is essential that you notify me in advance or as soon as possible after you missed the exam and the reason for missing the exam. If you have talked to me and gotten an excused absence for the missed exam, I will replace it with your final exam score. Failure to do so will result in a score of zero for the exam.

**Showing Work:** In order to receive full credit on the work out problems, you must show all details. Credit awarded for your answers will be based upon the correctness of your answers as well as the clarity and full steps of your reasoning. Answers alone, whether correct or not, are not sufficient to receive credit for your work. This applied to homework, in-class work, and exams. Leave your answers exact unless otherwise specified.

- ❖ **Incomplete Grades:** The grade of “I” may be given when any requirement of the course, including the final examination, is not completed. Arrangements to complete deficiencies in a course should be made with the instructor prior to the end of the semester or term. Incomplete work must be finished during the next long semester or the Records Office will change the “I” to the grade of “F”. While the extension may be granted by the instructor with the approval of his/her Department Chair and Academic Dean, once the “I” is changed to an “F” it cannot be changed back to an “I”. In this case, either a “change of grade” procedure must be initiated or the course must then be repeated if credit is desired. The instructor may record the grade of “F” for a student who is absent from the final examinations and is not passing the course.
- ❖ **Grade Disputes:** If you disagree with any deduction taken on your homework or exams handed back in class, you must bring it to my attention before leaving class the day the assignment is returned. Due to privacy policies, I do not discuss grades in emails/phones. If you have a question about your grade, please come see me in person.

Activity	Date (Tentative)	Percent
Homework/In-class assignment	Weekly	20
Exam I	09/25	20
Exam II	10/30	20
Exam III	11/27	20
Comprehensive Final Exam	12/11 8:00am-10:30am	20
Total		100

Range	Grade
90-100%	A
80-89%	B
70-79%	C
60-69%	D
0-59%	F

**E-Mail:** Check your email account every day. You are responsible for any information I send via email. Also, please use “3435” as the subject.

**Copyright Policy:** All notes, exams, printed handouts and/or assignments, and web-materials are protected by U.S. Copyright Laws. No multiple copies can be made without my written permission. No exams or assignments may be shared with anyone outside of the class or posted on any website.

**Changes:** While I have made a sincere effort to ensure that this syllabus is correct, changes may be required. I will announce any substantive changes during a regularly scheduled class (and possibly in a Blackboard announcement). If you find an error or omission, please advise me at once so that the other members of the class may be advised.

Lamar University  
Department of Mathematics  
Important Information for Students

Lamar University expressly prohibits intimidation and harassment of students, faculty, staff, or applicants. <http://students.lamar.edu/academic-support/code-of-conduct.html>

**Drop Policy:** Please make note of the three dates indicated in this drop policy. Any drop will be your responsibility; I will not drop a student from the course.

**September 13, 2017:** (Census Date-Six Drop Rule does not apply) A student may drop or withdraw without consulting with the instructor. The Six Drop Rule does not apply to a drop before 5:00 PM.

**September 29, 2017:** (Six Drop Rule applies) A student may drop or withdraw from the course without academic penalty and receive a Q, however, the Six Drop Rule applies. The student will consult with the instructor and the Records Office to initiate a drop.

**November 3, 2017:** (Six Drop Rule applies) Last day to drop or withdraw with academic penalty; the student must be passing the course at the time of the requested drop in order to receive a Q. The drop form, including all required signatures, must arrive in the Records Office by no later than 4:00 PM. No drop is allowed after this date except in extreme extenuating circumstances. Any "late drop" must be approved by the instructor, department chair, college dean, and provost.

**Academic Integrity:** Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Students are specifically warned against all forms of cheating and plagiarism. The *Lamar University Student Handbook* clearly reads: "Any student found guilty of academic dishonesty in any phase of academic work will be subjected to disciplinary action. Punishable offenses include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of source materials." One aspect of the *Handbook's* definition of cheating includes "purchasing or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm." Plagiarism is defined as "the appropriation and the unacknowledged incorporation of another's work or ideas into one's own and submitted for credit." Faculty members in the College of arts and Sciences investigate all cases of suspected plagiarism. Any student who is found cheating in this course will receive a course grade of F. <http://students.lamar.edu/student-handbook.html>

**Accommodations through the Disability Resource Center:** Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic

health, sensory, or physical), please contact the DRC at [409-880-8347](tel:409-880-8347) or [drc@lamar.edu](mailto:drc@lamar.edu) to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations. If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course. <http://www.lamar.edu/disability-resource-center/>

**Campus Closure:** In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage for instructions about continuing courses remotely. <http://lamar.edu>

**Emergency Procedures:** Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: <http://www.lamar.edu/about-lu/administration/risk-management/index.html>

Following are procedures for the first two:

**Severe Weather:**

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

**Violence/Active Shooter:**

- **CALL** - 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID**- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY**- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND**- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

**Course Evaluations:** You will have an opportunity to evaluate all aspects of this course in a formal process to be completed online near the end of the term. You will receive an email reminder through your LU account.

Math 3435 - Calculus III  
 Calculus Early Transcendental Functions  
 (Larson/Edwards) 6<sup>th</sup> Edition – List of Topics

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11.7	Cylindrical and Spherical Coordinates	<b>822</b>	7, 8, 14, 15, 23, 24, 27, 37, 38, 43, 45, 47, 51, 53, 54, 59, 62, 65, 70
<b>Vector-Valued Functions</b>			
12.1	Functions	<b>834</b>	1, 2, 8, 13, 14, 16, 17, 20, 49, 52, 53, 56, 70, 71, 73, 74
12.2	Differentiation and Integration	<b>842</b>	1, 3, 4, 6, 7, 12, 14, 17, 19, 23, 26, 29, 36, 39, 54, 55, 59, 63, 64
12.3	Velocity and Acceleration	<b>850</b>	2, 4, 6, 7, 13, 15, 18, 23, 26, 27, 28
12.4	Tangent and Normal Vectors	<b>859</b>	7, 10, 12, 13, 16, 21, 24, 25, 28, 29, 33, 34, 37, 39, 42
12.5	Arc Length and Curvature	<b>869</b>	2, 3, 6, 10, 11, 14, 22, 23, 26, 29, 31, 34, 38, 39, 45, 47, 49
<b>Functions of Several Variables</b>			
13.1	Introduction	<b>886</b>	19, 20, 21, 24, 26, 49, 51, 52, 56
13.2	Limits and Continuity	<b>898</b>	9, 13, 14, 15, 16, 24, 25, 27, 28, 31, 32
13.3	Partial Derivative	<b>908</b>	10, 12, 15, 21, 28, 34, 53, 60, 61, 62, 74, 75, 76, 78, 81, 83, 86
13.4	Differentials	<b>918</b>	1, 3, 8, 10, 11, 14, 16, 31, 32
13.5	Chain Rule	<b>925</b>	2, 3, 6, 8, 9, 11, 14, 16, 17, 19, 22, 24, 25, 27, 28, 31, 36
13.6	Directional Derivatives and Gradients	<b>933</b>	2, 3, 7, 8, 10, 11, 14, 19, 20, 22, 23, 25, 28, 29, 32, 33, 36, 37
13.7	Tangent Planes and Normal Lines	<b>945</b>	1, 3, 7, 8, 10, 14, 19, 22, 24, 29, 37, 38, 47, 50, 53, 56
13.8	Extrema of Functions	<b>954</b>	1, 4, 5, 7, 10, 12, 13, 22, 25, 38, 39, 42, 46, 47, 49, 52, 53
13.9	Applications	<b>962</b>	3, 9, 10, 11, 15,
13.10	Lagrange Multipliers	<b>970</b>	5, 6, 9, 10, 11, 12, 13, 14, 17, 18
<b>Multiple Integration</b>			
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14.2	Double Integrals and Volume	<b>992</b>	2, 7, 10, 11, 12, 15, 17, 20, 21, 22, 25, 27, 30, 35, 39, 40, 41, 43, 56, 58, 61
14.3	Change of Variables: Polar Coordinates	<b>1004</b>	1, 3, 5, 6, 9, 11, 17, 19, 23, 24, 29, 30, 35, 38, 43, 46, 48, 53
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14.5	Surface Area	<b>1020</b>	1, 3, 4, 7, 9, 11, 13, 15, 16, 29, 40
14.6	Triple Integrals and Applications	<b>1027</b>	1, 3, 5, 7, 13, 15, 19, 22, 25, 26, 27, 31, 35, 37, 38
14.7	Triple Integrals in Cylindrical and Spherical Coordinates	<b>1038</b>	1, 3, 5, 9, 12, 13, 15, 17, 20, 22, 33, 34, 36
14.8	Change of Variables: Jacobian	<b>1045</b>	1, 3, 5, 9, 11, 15, 17, 23, 26

**Vector Analysis**

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15.4	Green's Theorem	<b>1093</b>	1, 7, 8, 11, 15, 19, 21, 24, 27
15.5	Parametric Surfaces	<b>1102</b>	1-6, 9, 17, 19, 23, 28, 29, 37, 39, 45
15.6	Surface Integrals	<b>1112</b>	1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 25, 28, 29
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15.8	Stokes's Theorem	<b>1132</b>	1, 3, 5, 7, 9, 11, 13, 19