

**Fall 2021. MATH2450. Sections 013.**

## **Calculus III With Applications.**

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**Classroom and Time:** MWF 10:30 am - 11:45 am, Mathematics Building 110.

**Office hours:** MW 2:00 pm - 3:30 pm. In person or online via Zoom. (Zoom information will be listed on [TTU Blackboard](#).)

**Course website:** <http://www.math.ttu.edu/~lhoang/2021Fall-M2450-013/>

**All lectures will be delivered in class face-to-face.**

**Potential for Course Modality Change.** If Texas Tech University campus operations are required to change because of health concerns related to the COVID-19 pandemic, it is possible that this course will move to hybrid or fully online delivery format. Should that be necessary, students will likely need a webcam and microphone and will be advised of additional technical and/or equipment requirements, including remote proctoring software.

**Prerequisite:** (at least a) C in Math 1352 or Math 1452.

**Text:** *CALCULUS*, by K. Smith, M. Strauss and M. Toda; 7th Edition published by Kendall Hunt.

**Course Description:** Partial differentiation, functions of several variables, multiple integrals, line integrals, surface integrals, Stokes Theorem. Applications and problem-solving are strongly emphasized. Partially fulfills Core Mathematics requirement.

**Mission Statement:** This course covers Calculus of several variables. The concepts are extensions of the concepts from Calculus I. It is necessary to remind the students of those basic concepts, as the course progresses. Multivariable Calculus is an important tool in Science and Engineering. The instructor should emphasize the importance of all relevant concepts, including: curves and surfaces in Euclidean 3-space, length and curvature, area and volume; surfaces, partial derivatives, total differential, tangent planes to surfaces; gradient; vector-valued functions; path integral; Stokes' theorem, which should be stated, with an emphasis on its important particular cases, Green's Theorem and Divergence Theorem - followed by a few basic examples. This course is organized as a four hour lecture for the regular academic year (Fall and Spring) and the corresponding amount of hours for each Summer Session. Each hour will be devoted to covering the material from the text-book integrated with applications, examples and exercises that are relevant to the learning objectives, and improve the student success in the examinations.

## Course Outline:

- Chapter 9 – (9.1-9.4 for Review, 9.5-9.7) Vectors in the Plane and in Space (6 hours)
- Chapter 10 – (10.1-10.4) Vector-Valued Functions (5 hours)
- Chapter 11 – (11.1-11.8) Partial Differentiation (11 hours)
- Chapter 12 – (12.1-12.8) Multiple Integration (12 hours)
- Chapter 13 – (13.1-13.7) Vector Analysis (11 hours)

**Student Learning Outcomes:** MATH 2450 satisfies the university core curriculum requirement in Mathematics: “Students graduating from Texas Tech University should be able to demonstrate the ability to apply quantitative and logical skills to solve problems.” It meets the TTU general education student learning outcomes for mathematics that students will:

- Apply arithmetic, algebraic, geometric, statistical, and logical reasoning to solve problems.
- Represent and evaluate basic mathematical and/or logical information numerically, graphically, and symbolically.
- Interpret mathematical and/or logical models such as formulas, graphs, tables, and schematics, and draw inference from them.

**Course-Specific Learning Outcomes:** Students develop skills in differentiation and integration needed to solve problems in 3-dimensional space. In particular the students will master the concepts of

- tangent and normal vectors, and their geometric and physical interpretations
- partial derivatives, tangent planes, directional derivatives, and gradients, and how to compute them
- three-dimensional integration, and how to compute such integrals
- vector fields, divergence, and curl, and certain applications to the real world and other sciences

**Methods of Assessment of Learning Outcomes:** Assessment of the learning outcomes will be achieved through homework assignments, three midterm exams, and a final exam. The exams will have both multiple choice questions and comprehensive problems.

**Homework Assignments:** will be assigned weekly through Webwork. Students will receive the instructor's message for login information. Due dates are indicated on each assignment. Students should spend very first week to get familiar with the system. If a student does not receive Webwork message from the instructor by Wednesday, August 25, he/she must contact the instructor immediately.

**Webwork Link:** <https://webwork.math.ttu.edu/webwork2/f21lhoangm2450s011s013/>

**Grading Policy:** Homework will count for 25% of the grade. There will be three midterm exams in class, each will count for 15% of the grade. The final exam will count for 30% of the grade. No make-up exams are given unless legitimate documents for excuses are presented to the

instructor at least a week in advance. (The scores will be calculated to 2 decimal places, for example, 69.98.)

Grading Scale:  $A \geq 90$ ,  $80 \leq B < 90$ ,  $70 \leq C < 80$ ,  $60 \leq D < 70$ ,  $F < 60$ .

**Calculators:** Only scientific calculators are allowed in exams. These calculators can calculate the values of the standard algebraic, trigonometric, exponential and logarithmic functions. Graphing calculators and calculators that can do symbolic manipulations are NOT allowed.

**Attendance Policy:** Students must go to lectures and responsible for all material covered in class.

### **Examination Schedule:**

- Midterm 1: Wednesday, September 15, in class.
- Midterm 2: Wednesday, October 13, in class.
- Midterm 3: Wednesday, November 10, in class.
- FINAL EXAM: Tuesday, December 7, 10:30 a.m. - 1:00 pm.

### **Critical Dates:**

- Aug. 23: Classes begin.
- Aug. 26: Last day for student-initiated addition of a course on MyTech.
- Sep. 6: Labor Day. University holiday.
- Sep. 8: Last day for student-initiated drop on MyTech without academic penalty (drop does not count against drop limit).
- Nov. 22 - Dec. 1: No examinations.
- Nov. 23: Last day for student-initiated drop on MyTech with academic penalty (counts against drop limit).
- Nov. 24-28: Thanksgiving holiday.
- Dec. 1: Last day of classes.

### **TTU OPs:**

ADA accommodations (TTU Operating Policy 34.22). Any student who, because of a disability, may require some special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services, during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or (806) 742-2405.

Absence for observance of a religious holy day (TTU Operating Policy 34.19). 1. "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code 11.20. 2. A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who

is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. 3. A student who is excused under Section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Academic Honesty (TTU Operating Policy 34.12). It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension. "Scholastic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

**Alert:** This is a 4-hour credit course. It is important, difficult, fast and intense. Students must work hard or very hard to stay on top of it!

**Advice:** Come to class regularly, work on homework problems. Ask questions in class and get help from the Tutoring Center (information will be provided) or from the instructor during the office hours. Since a lot of material will be covered, students have to master them quickly and *do not* wait too late until the midterms or the final exam. Students are encouraged to give feedbacks to the instructor during the semester.

**Notes:** When needed, the instructor will communicate with the students using their TTU email addresses. At the beginning of the semester, the instructor will send out two special email messages. One is to confirm the students' email addresses, the other one is about Webwork. If a student does not receive those messages by the second class (Wednesday, August 25) he/she must contact the instructor immediately.

## Covid Related Class Policies

**Vaccinations:** Texas Tech University strongly recommends students adhere to CDC guidelines on COVID-19, including obtaining COVID-19 vaccinations. If you were unable to obtain a vaccination prior to your arrival on campus, the COVID-19 vaccine is available at Student Health Services by appointment. You can find additional information about the vaccine [here](#), and about the recently announced incentive program [here](#).

**Face Covering Policy:** As of May 19, 2021, face coverings are optional in TTU facilities and classrooms but, based on CDC guidelines, are recommended and welcome, especially for those who have not been vaccinated for COVID-19 or who may have susceptibilities to the virus. Face coverings are required in public transportation (e.g., Citibus) and in the Student Health Clinic.

**In-Person Office Hours:** For in-person office hours, masks are optional but welcome.

**Personal Hygiene:** We all should continue to practice frequent hand washing, use hand sanitizers after touching high-touch points (e.g., door handles, shared keyboards, etc.), and cover faces when coughing or sneezing.

**Potential Changes:** The University will continue to monitor CDC, State, and TTU System guidelines in continuing to manage the campus implications of COVID-19. Any changes affecting class policies or delivery modality will be in accordance with those guidelines and announced as soon as possible. If Texas Tech University campus operations are required to change because of health concerns related to the COVID-19 pandemic, it is possible that this course will move to a fully online delivery format. Should that be necessary, students will be advised of technical and equipment requirements, such as web cam, microphone, and remote proctoring software.

## Covid Related TTU Policies

Click [here](#) for see the full document issued by the Provost Office on August 13.

- Although COVID-19 vaccinations are not mandated, **Texas Tech is strongly recommending that all students be vaccinated for COVID-19.** The vaccines are [safe and effective](#) and will protect the student and other members of the Texas Tech community.
- **Masks will not be required for either indoor or outdoor activities on campus, however, all visitors to the Student Health Clinic will be required to wear a mask.** The wearing of masks while in public indoor settings and frequently washing your hands has proven to be effective at preventing the spread of COVID-19.
- The CDC recommends that both vaccinated and unvaccinated individuals wear a face mask indoors after a known exposure.
- Prior to arrival on campus, all **unvaccinated** students in university housing should develop an action plan in the event they are required to self-isolate or quarantine due to a positive COVID-19 diagnosis or exposure. This plan should include a location to complete the self-isolation/quarantine period, access to groceries/meal delivery, access to necessary medications, numbers of emergency contacts, and contact information for their preferred healthcare provider.
- **Fully vaccinated students** who aren't experiencing symptoms will not be required to [quarantine](#) following an exposure to a COVID-19 positive person, including roommates. Following a known exposure, students should monitor for symptoms over the course of 14 days and quarantine if [symptoms](#) develop.
- **Fully vaccinated students** who receive a positive diagnosis for COVID-19 will be required to [self-isolate](#). Students that are vaccinated, including those with medical and religious exemptions, and live in university housing will be provided with a location to complete the self-isolation period. If an off-campus location is necessary, the university will cover the associated housing expenses.
- **Unvaccinated or undisclosed students** who have been identified as having a known exposure to a COVID-19 positive person will be required to [quarantine](#) for a minimum of 7 days or longer depending upon testing. If a student is unvaccinated and can prove a

COVID-19 diagnosis and recovery in the last three months, quarantine will not be required.

- **Unvaccinated or undisclosed students** who receive a positive diagnosis for COVID-19 will be required to [self-isolate](#). The university will offer information regarding off-campus options for unvaccinated students that reside in university housing to complete the self-isolation period but will not cover any associated expenses.
- **Any student** who has a laboratory confirmed case of COVID-19 must use this [link](#) to report.
- Students who have a high-risk exposure to someone with confirmed or suspected COVID-19 in the last 2 weeks should access the online reporting platform to take a “quick assessment” or “full self-screening.” Based on responses, automated messages provide contact information for campus/clinic resources, emergency room precautions, or planning observation.
- Students who are fully vaccinated and want to participate in the vaccination incentive opportunity may submit their vaccination record to Student Health Services using the Submit Vaccination Record button at <https://www.depts.ttu.edu/communications/emergency/coronavirus/>