Math2326: Calculus III

Spring 2019

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Office Hours: Tuesday and Thursday 2:00–3:00 pm, and by appointment
Section Information: Math2326-004

Time and Place of Class Meetings: PKH321, Tuesday and Thursday 12:30-1:50 pm.

Description of Course Content: Course Content: Introductory course on vector functions in two or three dimensions, functions of two or more variables, their partial derivatives and extrema, the chain rules, directional derivatives, multiple integration, line integral, surface integrals, Green's theorem, Stokes' theorem, and the divergence theorem.
Prerequisite: C or better in MATH 2425 or HONR-SC 2425.

Student Learning Outcomes: Upon completion of MATH 2326:

1. Students will be able to use the concepts of continuity, differentiation, and integration of vector-valued functions to determine unit tangent and unit normal vectors in the process of modeling objects in three dimensions Students will be able to parametrize piecewise-smooth curves using arc length. They will be able to compute the curvature of a space curve.
2. Students will be able to compute and sketch level curves and level surfaces for functions of several variables and sketch the graphs of functions of two variables. Analyzing limits, determining continuity, and computing partial derivatives of multivariate functions is also expected. Students will be able to use tangent planes, directional derivatives, gradients, the second partials test, and Lagrange multipliers to approximate and solve optimization problems.
3. Students will be able to demonstrate techniques of multiple integration and compute iterated integrals over rectangular regions, non-rectangular regions and in other coordinate systems. They will be able to apply multiple integrals in problem situations involving area, volume, surface area, center of mass, moments of inertia, etc.
4. Students will be able to compute line integrals and surface integrals by applying the Fundamental Theorem for Line Integrals, Greens Theorem, Stokes Theorem, and the Divergence Theorem. Applying these integrals to solve applications such as mass and work problems is also expected.

Required Textbooks and Other Course Materials:
This course is part of the UTA Mathematics Department Affordability Campaign, making state-of-the-art online mathematics resources available to our students at the lowest possible price when compared to purchasing elsewhere. To receive the discounted price, purchase course materials through the UTA Bookstore. Search by course or use this site: http://bit.ly/2tQ090S

1. E-text and Direct Access (Required): Your course materials include the e-version of the course text as well as MyLab course access which is designed to enrich student success by providing instant feedback on your assignments plus on-demand access to personalized study plans, a multimedia library, practice tests, and more. The e-texts may be downloaded on multiple devices with long-term access for each student. Every student has trial access to MyLab course materials as soon as the course is available in Blackboard, so you can start working on your course even before you purchase the course materials! That said, students

will need a verified purchase within the first two weeks of classes, otherwise, the access to your digital materials will freeze and your account will stay deactivated until the purchase is confirmed. During the purchasing process, please ensure you enter your name as shown on your UTA records along with your MAVS email address for proper processing.

2. Loose-leaf Textbook (Optional): You may choose to enhance your digital purchase and select a loose-leaf textbook for only $25 from the bookstore. Full details are available in Blackboard. Calculus - Early Transcendentals, 3rd Ed., Briggs, Cochran, Gillett & Schulz, Pearson Ed. Inc., 2019. ISBN: 9780134770512

Optional Textbook: Calculus Volume 3, Gilbert Strang et al. Available for free online! The book comes in web view or PDF format, and you can use whichever format you want. Web view is recommended -- the responsive design works seamlessly on any device. Calculus Volume 3 from OpenStax, ISBN 1938168070, www.openstax.org/details/calculus-volume-3

Descriptions of major assignments and examinations: Homework will be assigned periodically, there will be two in-class exams, and a departmental final exam. You are required to bring a scantron, form 882-E for possible multiple choice exams.

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I require regular attendance. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Grading: Homework is worth 30%, each midterm exam is worth 20%, and the final exam will have a weight of 30%. Course grades are assigned based on the following percentages: F 0-59, D 60-69, C 70-79, B 80-89, A 90-100. Other grades such as W or X will be assigned in accordance with the guidelines in the catalog. Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see "Student Support Services," below.

Make-up Exams: You will need a university valid excuse in order to have a make-up exam.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can

continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at https://www.uta.edu/conduct/. Faculty are encouraged to discuss plagiarism and share the following library tutorials http://libguides.uta.edu/copyright/plagiarism and http://library.uta.edu/plagiarism/

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit http://www.uta.edu/sfs.

Final Review Week: for semester-long courses**,** a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at the north end of the building. When exiting the building during an emergency, one should never take an

elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

University Tutorial & Supplemental Instruction (Ransom Hall 205): UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit www.uta.edu/utsi or call 817-272-2617.

The IDEAS Center (2nd Floor of Central Library) offers FREE tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. http://library.uta.edu/academic-plaza

Math Clinic Tutoring Available: The Math Department operates the Math Clinic, a tutoring service staffed by upper level undergraduate students. You will need to show your Mav ID to use the Math Clinic. There are tables where you may study on your own or quietly with other students. Each table has a flag that you can raise to indicate that you need help from a tutor. The Math Clinic is on the 3rd floor or Pickard Hall. Go to the Math Clinic webpage http://www.uta.edu/math/clinic/ to get more information or to access assignment sheets for the courses for which tutoring is offered. Private Tutoring: The Math Dept. maintains a list of people who have expressed an interest in tutoring. These persons are not necessarily recommended by the Math Dept. and they set their own fees. You may obtain a copy of the tutor list in the Math Office.

Course Schedule: We will cover the following sections from the text:

1st and 2nd week, Sections: 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 14.1, 14.2. Vector and Vector-Valued Functions. Calculus of Vector-Valued Functions
3rd and 4th week, Sections: 14.3, 14.4, 14.5, 15.1, 15.2, 15.3. Motion in Space. Length of Curves. Curvature. Functions of Several Variables. Limits. Partial Derivatives.
5th and 6th week, Sections: 15.4, 15.5, 15.6. Chain Rule. Gradient. Tangent plane.
7th and 8th week, Sections: 15.7, 15.8, 16.1, 16.2, 16.3. Extrema of Functions. Lagrange Multipliers. Multiple Integrals.
9th and 10th week, Sections: 16.4, 16.5, 16.6. Triple Integrals in Cartesian, Cylindrical and Spherical Coordinates. Mass.

11th and 12th week, Sections: 16.7, 17.1, 17.2, 17.3, 17.4. Change of variables. Vector Fields. Line Integrals. Green's Theorem.
13th and 14th week, Sections: 17.5, 17.6, 17.8. Divergence and Curl. Surface Integrals. Stokes Theorem. Divergence Theorem.
Review week.
Test 1 (tentative) 13.1-13.6, 14.1-14.5, 15.1-15.5
Test 2 (tentative) 15.6-15.8, 16.1-16.5
Final Exam (cumulative) 16.6-16.7, 17.1-17.8 (plus above sections)

Important Dates (Fall 2018):
January 12 First Day of Class
January 30 Census Date (Deadline for makeup requests for ALL exams)
Thursday February 21 Midterm 1, tentative
March 11-16 Spring Break
Thursday March 26 Midterm 2, tentative
March 29 Last day to drop a class
May 3 Last day of classes
Saturday May 4 Final Exam (May change)

As the instructor for this course, I reserve the right to adjust this schedule in anyway that serves the educational needs of the students enrolled in this course.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381