

Math 2326–004: Calculus III

Spring 2016, PKH 103, TTh 12:30–1:50 PM

Instructor: Dr. Christopher Kribs

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Office Hours: before & after class, and by appointment

Prerequisite: MATH 2425

Text materials: Soo Tan, *Calculus*, Brooks/Cole, 2011. Custom version for UT Arlington includes WebAssign for online homework and resources: <http://webassign.net>, class key for our section is *uta 2656 3182*.

Course home page: <http://mathed.uta.edu/kribs/2326.html>

Last day for withdrawal: April 1

Final exam: Saturday, May 7, 3:30–6:00 PM (note time)

Other exam dates (tentative): Tue Feb 23, Tue Apr 5, both in-class

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 integrals, surface integrals, Green's theorem, Stokes's theorem, and the divergence theorem.

LEARNING OUTCOMES: Upon completing this course, 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*;
- *parametrize piecewise-smooth curves using arc length*, and *compute the curvature of a space curve*;
- *compute and sketch level curves and level surfaces* for functions of several variables and *sketch the graphs of functions of two variables*;
- *analyze limits, determine continuity, and compute partial derivatives of multivariate functions*;
- *use tangent planes, directional derivatives, gradients, the second partials test, and Lagrange multipliers* to approximate and solve optimization problems;
- *demonstrate techniques of multiple integration and compute iterated integrals over rectangular regions, non-rectangular regions, and in other coordinate systems*;
- *apply multiple integrals in problem situations involving area, volume, surface area, center of mass, moments of inertia, etc.*;
- *compute line integrals and surface integrals by applying The Fundamental Theorem for line integrals, Green's theorem, Stokes's Theorem and the Divergence Theorem, and apply these integrals to solve applications such as mass and work problems.*

GRADES:

Course grades will be determined by five components: two midterm exams (25% each), a departmental final exam (30%), graded homework assignments (10%), and a project (10%), with letter grades following standard ten-point increments except when announced otherwise. Details on each component are provided later in this syllabus. 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.

POLICIES:

Expectations for class time: This class meets every Tuesday and Thursday (except spring break) from January 19 to May 5. Students are expected to be on time, prepared and ready to work at 12:30. Students are expected not only to attend, but to actively participate in, class discussions, in order to maximize learning and help the instructor gauge the pace. Students are also expected to seek help [from the instructor, the Math Clinic (free drop-in help in PKH325), or others] on homework problems *before* the class session at which they are due. Class time will be available to address misconceptions and confusions common to many students in the class, but it is often not possible to devote time to going over every problem on which anyone had difficulty. As a sign of respect for your peers and our common work, please keep all cellular phones, computers, and other electronic devices turned off during class. In emergencies cell phones may be set to vibrate only, and brief calls taken in the hallway outside.

Expectations for out-of-class study: The general rule of thumb for college courses is that for every hour spent in class, a student should spend 3 hours per week outside of class working on the course (this is why a 12-hour load is considered full-time: $12 \times 4 = 48$). This includes time spent reading, studying, working on homework, consulting the instructor or tutors, etc.

Attendance: Class attendance has been shown to be directly correlated with students' grades in general. Although there is no explicit penalty for absences, students who miss class remain responsible for understanding the topics, vocabulary, techniques, and notation used in class (as much as possible this will be consistent with the text). Students are also expected to make every effort to arrive on time (important announcements are often made at the beginning of class and not repeated), and to minimize disruption if they arrive late.

Written work: Any papers submitted for a grade (hard copy) should be labeled clearly and legibly with your name, class, and assignment; multiple pages should be stacked neatly together (edges trimmed if pages taken from a spiral notebook) and stapled together in the upper left corner. Text may be handwritten but is expected to be legible, *with the work and reasoning clearly communicated*.

Late papers: Late homework assignments submitted on WebAssign will not be possible, as the system will not accept submissions after the deadline (the beginning of class on the due date).

Make-up exams: No make-up exams will be given regardless of reason, unless the student presents, *before* the exam, sufficient justification to the instructor to convince him to make such arrangements. Due to grade reporting time constraints, no make-up final exams will be given.

Calculators: On the midterms and final you will be allowed to use ONLY Texas Instruments calculators in the TI-30 series. Any other calculators, as well as any other electronic devices including cell phones, are forbidden during exams; their presence during an exam will be considered cheating and result in an exam grade of 0.

Everything else: Class policy on drops, withdrawals, academic honesty, grade grievances, and accommodating disabilities follows the University policy on these matters. Copies can be obtained upon request.

Exams

There will be two exams (both in class) during the semester and one departmental final exam during the assigned final exam period. All exams will be cumulative, closed-book, and closed-notes, but students will be allowed to prepare and use a single 4"×6" card with notes written on both sides, as insurance against "mental blanks". See policies regarding calculator use and electronics, and make-up exams, on page 2 of this syllabus. Students should consult the instructor well in advance of the exam dates with any questions about exam policies.

Homework

The calendar at the end of this syllabus includes the standard departmental assignment sheet listing recommended problems to work for each section. These include some simple problems and some more complex problems, and students should work all of them in order to build experience progressively. Students will **not** submit these problems for grading. Instead, weekly homework assignments, based on problems from the text, will be assigned on WebAssign, and completed/submitted on that site, due each Tuesday, over sections discussed through the end of the previous class period. When a Tuesday class meeting is cancelled due to inclement weather, homework normally due that day will be due the day of the following class meeting; later due dates will remain on Tuesdays. Problems assigned for collection are generally among the more advanced within a section, so students should work the previous, simpler problems before attempting them.

Note that most problems on WebAssign have space only for the answer. Less frequently a problem will instead require that students upload an image showing their full work for the problem; this will require that students take a snapshot or scan of their work to upload. Such problems will only be graded if they are sufficiently legible, at the instructor's discretion.

Project

Most of the homework and exam problems ask students to complete a computation and/or provide a short answer to a question, but real-world applications typically involve complicated functions and messy data which are intractable by hand, and interpretation of the results of mathematical analyses. In such situations, technology helps us visualize functions of several variables and produce numerical solutions for complex computations. To help you develop practice in applying techniques discussed in class, a short project will be assigned just before spring break, due a few weeks later (see calendar), involving tasks which require technology use and a little critical thinking.

The specific project prompts (tasks) will be distributed at the time the project is assigned. Students will need to use some kind of technology capable of generating three-dimensional graphs and symbolic (as well as numerical) derivatives and integrals, whether it is a computer-based package such as *Mathematica*, *Maple*, or *Matlab*, or a phone-based app such as *Wolfram Alpha*. Note that students will need to include graphics in their reports, so will need a way to save the graphics and import them into a word processor. The instructor will provide support in class for *Mathematica* (with which *Wolfram Alpha* is partially compatible), and help individual students troubleshoot (whatever system they are using) to the extent possible during office hours.

The final report must contain as an appendix a list of all resources (books, articles, web sites, people, software, etc.) consulted in working on this project (the main text should also make clear when and how such resources were used, e.g., in performing computations, generating graphs, etc.). You do not need to cite your instructor.

Students may work together in solving the problems, but reports, including all graphs and written responses, must be individual. Please be very very careful not to use words written by another person as your own. Plagiarism will result in a grade of 0.

Calendar

A *tentative* schedule with topics is given below (subject to updating). The instructor reserves the right to adjust the schedule in any way that serves the needs of the students enrolled in this course.

Date	Section(s)	Departmental assignment sheet
1/19	11.1	2, 6, 9, 11, 12, 13, 16, 21, 25, 33, 35, 36, 38, 40, 41, 43, 45, 46, 53, 54
	11.2	3, 6, 7, 11, 14, 17, 20, 22, 25, 30, 33, 39, 49, 50
1/21	11.3	3, 7, 11, 12, 14, 16, 19, 25, 27, 30, 33, 34, 35, 36, 44
1/26	10.6	2, 3, 4, 9, 13–20, 22, 30, 39, 47, 49, 53
1/28	12.1	2, 3, 5, 7, 8, 13, 15, 16, 24, 26, 27, 33–38, 43, 44, 46, 51, 53, 54, 57–62
	12.2	2, 5, 8, 11, 14, 15, 21, 27, 28, 32, 34, 35, 41
2/02	12.3	1, 10, 17, 23, 30, 33, 35, 42, 43, 53, 61, 76
2/04	12.4	1, 5, 8, 23, 25, 31, 33, 37
	12.5	5, 7, 10, 13, 22, 25, 27, 30, 35, 41, 43, 52
2/09	12.6	3, 7, 13, 16, 22, 32, 35, 37, 53, 54
2/11	12.7	3, 6, 11, 12, 22, 32, 33, 40
2/16	12.8	4, 7, 15, 22, 33, 35, 41, 45, 49
2/18	12.9	1, 6, 10, 11, 15, 17, 19, 24, 32, 43
2/23	Exam 1	covers through 12.9
2/25	13.1	1, 3, 7, 13, 16, 19, 25
3/01	13.2	2, 5, 10, 13, 16, 22, 27, 31, 35, 38, 51, 54, 59, 62
3/03	13.3	9, 12, 15, 19, 24, 29, 37, 40
3/08	13.4	3, 9, 13, 25, 26
3/10	13.5	3, 6, 9, 11, 14, 24; project assigned
(3/15 & 3/17		<i>spring break</i>)
3/22	13.6	6, 9, 12, 13, 19, 27, 30, 44, 51, 57
3/24	10.7	3, 11, 14, 22, 28, 36, 37, 43, 48, 53, 61, 64, 71
3/29	13.7	3, 5, 11, 13, 16, 23, 26, 31, 32, 38, 40, 41, 43
3/31	13.8	3, 4, 7, 10, 12, 13, 15, 18, 23, 26, 27, 28
4/05	Exam 2	covers through Chapter 13 and 10.7
4/07	14.1	1, 2, 3, 4, 5, 6, 8, 9, 14, 19, 21, 22, 27, 30, 31; project due
4/12	14.2	5, 10, 13, 14, 15, 19, 20, 27, 28
4/14	14.3	3, 6, 7, 11, 18, 21, 25, 29, 30, 36
4/19	14.4	3, 7, 11, 14, 17, 20, 21, 23, 26, 27, 31, 33, 37, 42
4/21	14.5	2, 3, 7, 12, 15, 18, 28, 29
4/26	14.7	5, 7, 10, 15, 17, 21, 25, 28, 29
4/28	14.8	3, 5, 8, 10, 17, 19
5/03	14.9	3, 5, 9, 11, 14, 17, 24
5/05		catch-up/review
5/07	Exam 3	cumulative

University Policies

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, 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.

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://wwwb.uta.edu/ses/fao>).

Americans with Disabilities Act: 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)*. 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 that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817)272-3364.

Title IX: 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. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled in this course 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 as they see fit in their courses, including (but not limited to) 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. *Papers involving plagiarism will receive an indelible grade of zero.*

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>.

To obtain your NetID or for logon assistance, visit <https://webapps.uta.edu/oit/selfservice/>. If you are unable to resolve your issue from the Self-Service website, contact the Helpdesk at helpdesk@uta.edu or (817)272-2208.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback data is required by state law; students are strongly urged to participate. www.uta.edu/sfs

Final Review Week: 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.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current graduate catalog.

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. 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 make arrangements to assist individuals with disabilities.

Student Support Services: UTA 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 www.uta.edu/resources.

Emergency Phone Numbers: In case of an on-campus emergency, call the UTA Police Department at **817-272-3003**, or dial 911.