

# Syllabus

Title	Calculus III
Number	MATH 2415-201
Time	MTWR 12:30–1:20
Place	BH 206
Instructor	David Milovich
Email	david.milovich@tamiu.edu
Phone	(956) 326-2570
Office	BVC 321
Hours	MTWR 2-5
Department	Engineering, Mathematics, and Physics
College	Arts and Sciences
Institution	Texas A&M International University
Term	Spring 2014

**Course description.** Vector operations in  $\mathbb{R}^2$ ,  $\mathbb{R}^3$ , lines, planes; vector-functions, space curves, curvature; multivariable calculus, optimization, Lagrange multipliers; multiple integrals; vector fields, theorems of Green, Gauss and Stokes. Prerequisite: MATH 2414.

**Student learning outcomes.** Upon successful completion of this course, the student 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;
- compute the curvature and torsion of a curve in space;
- calculate and sketch level curves and level surfaces for functions of several variables and sketch the graphs of functions of two variables;
- compute limits, determine continuity, and compute partial derivatives of multivariable functions;
- use tangent planes, directional derivatives, gradients, the second partials test, and Lagrange multipliers to approximate functions and solve optimization problems;
- demonstrate techniques of computation of multiple integral and compute iterated integrals over planar regions involving change of coordinate systems;
- apply multiple integrals to solve problems involving area, volume, surface area, center of mass, and moments of inertia;
- compute line integrals and surface integrals by applying The Fundamental Theorem for line integrals, Green's theorem, Stoke's Theorem and the Divergence Theorem, and applying these techniques to solve application problems such as work problems.

## Textbook.

- Required: *Calculus: Early Transcendentals*, Stewart, 7th ed. (2012). ISBN 9780538497909.
- Bring your book to class every day.

## Technology.

- Email latency. I expect you to check your TAMIU email (dusty.tamiu.edu) and ANGEL (elearning.tamiu.edu) at least five days a week. Conversely, I will reply to your emails no later than the next day, except that Saturday emails may not receive a reply until Monday.
- I frequently use ANGEL to send messages to the class (which should get copied to your TAMIU email too). I also frequently post content such as board photos to the ANGEL Lessons tab.
- Calculators. At minimum, a scientific calculator is required. I strongly recommend a calculator that also includes a computer algebra system and parametric and 3D plotting capabilities. Examples include the TI89, TI92, TI-Nspire CAS, and HP-50g.
- Bring your calculator to class every day.
- Do not rely on a phone calculator. Phones are not allowed during tests.
- For exploring 3D plots outside of class, computers are recommended. If you have a personal computer, then I recommend installing the excellent free software Sage (see [sagemath.org](http://sagemath.org)). If you do not have a personal computer, then I recommend the BVC 202/205 computer labs and using Sage via a free account at [cloud.sagemath.com](http://cloud.sagemath.com).

### Homework.

- Homework is progressively assigned daily in class and due in batches of four or five days' assignments, usually three days after the last day for the batch. See the schedule section below for all due dates.
- If you do your homework as part of a group, then your group should just turn in one homework with everyone's name on it.

### Tests.

- Dates: 2/17, 3/4, 3/27, 4/14, and final exam date.
- All tests are open-book and open-note (so the questions will be harder).
- All tests require a calculator.
- All tests forbid phones.
- When studying for tests, focus on your lecture notes and homework exercises.
- The first four tests each cover about nine class days of material, about one week after the material was covered in class.
- The final exam is comprehensive.

### Grading.

Homework is worth 35% of your grade. Tests 1–4 are each worth 10% of your grade. The final exam is worth 25% of your grade.

letter	minimum score requirement
A	90% score OR in top 10% of scores
B	80% score OR in top 30% of scores
C	70% score OR in top 65% of scores
D	60% score OR in top 80% of scores
F	

**Make-ups.** There are no make-ups for missed work, except by situations covered by university rules.

day	date	HW due	Ch.	tentatively scheduled topics	test
1	Jan 22		12	plotting in 3D	
2	Jan 23		12	paraboloids	
3	Jan 27		12	vectors: as positions and displacements; vector algebra	
4	Jan 28		12	dot products: lengths, angles, and projections	
5	Jan 29		12	cross products: areas, volumes, and angles	
6	Jan 30		12	lines: representations; distances to points and lines	
7	Feb 03	1--4	12	planes: representations; angles between lines/planes	
8	Feb 04		12	distances between planes, lines, and points	
9	Feb 05		13	curves: (unit) tangent vectors and arc length	
10	Feb 06		13	curvature and (bi)normal vectors	
11	Feb 10	5--8	13	applications to velocity and acceleration	
12	Feb 11		14	partial derivatives	
13	Feb 12		14	the two-variable limit concept; continuity	
14	Feb 13		14	the two-variable limit concept; continuity	
	Feb 17				1--8
15	Feb 18		14	the two-variable linear approximation concept; differentiability	
16	Feb 19	9--13	14	the two-variable linear approximation concept; differentiability	
17	Feb 20		14	applications of linear approximation	
18	Feb 24		14	applications of linear approximation	
19	Feb 25		14	chain rule	
20	Feb 26	14--17	14	chain rule	
21	Feb 27		14	higher partial derivatives	
22	Mar 03		14	2D gradients; directional derivatives	
	Mar 04				9--17
23	Mar 05		14	3D gradients	
24	Mar 06		14	local extrema	
25	Mar 17	18--22	14	local extrema	
26	Mar 18		14	Lagrange multipliers	
27	Mar 19		14	Lagrange multipliers	
28	Mar 20		15	2D Riemann sums; double integrals (rectangular domain)	
29	Mar 24	23--26	15	iterated integrals (rectangular domain)	
30	Mar 25		15	double/iterated integrals over more elaborate domains	
31	Mar 26		15	double integrals in polar coordinates	
	Mar 27				18--26
32	Mar 31		15	double integrals in arbitrary coordinates	
33	Apr 01	27--31	15	double integrals in arbitrary coordinates	
34	Apr 02		15	triple integrals	
35	Apr 03		15	triple integrals in cylindrical coordinates	
36	Apr 07		15	spherical coordinates	
37	Apr 08	32--35	15	triple integrals in spherical coordinates	
38	Apr 09		16	vector fields	
39	Apr 10		16	line integrals	
	Apr 14				27--35
40	Apr 15		16	fundamental theorem of line integrals	
41	Apr 16		16	Green's theorem	
42	Apr 17	36--40	16	Green's theorem	
43	Apr 21		16	curl	
44	Apr 22		16	divergence	
45	Apr 23		16	parametric surfaces	
46	Apr 24	41--44	16	surface area	
47	Apr 28		16	surface integrals	
48	Apr 29		16	Stoke's theorem	
49	Apr 30		16	Stoke's theorem	
50	May 01	45--48	16	Guass's theorem	
51	May 05		16	Guass's theorem	
52	May 06		16	optional topic	
	May 07	49--51		reading day (no class)	
				final exam	1--52

# **Policies of the College of Arts and Sciences**

(Required on all COAS Syllabi)

## **Classroom Behavior**

The College of Arts and Sciences encourages classroom discussion and academic debate as an essential intellectual activity. It is essential that students learn to express and defend their beliefs, but it is also essential that they learn to listen and respond respectfully to others whose beliefs they may not share. The College will always tolerate diverse, unorthodox, and unpopular points of view, but it will not tolerate condescending or insulting remarks. When students verbally abuse or ridicule and intimidate others whose views they do not agree with, they subvert the free exchange of ideas that should characterize a university classroom. If their actions are deemed by the professor to be disruptive, they will be subject to appropriate disciplinary action, which may include being involuntarily withdrawn from the class.

## **Plagiarism and Cheating**

Plagiarism is the presentation of someone else's work as your own. **1)** When you borrow someone else's facts, ideas, or opinions and put them entirely in your own words, you must acknowledge that these thoughts are not your own by immediately citing the source in your paper. Failure to do this is plagiarism. **2)** When you also borrow someone else's words (short phrases, clauses, or sentences), you must enclose the copied words in quotation marks as well as citing the source. Failure to do this is plagiarism. **3)** When you present someone else's paper or exam (stolen, borrowed, or bought) as your own, you have committed a clearly intentional form of intellectual theft and have put your academic future in jeopardy. This is the worst form of plagiarism.

Here is another explanation from the 2010, sixth edition of the *Manual of The American Psychological Association* (APA):

*Plagiarism:* Researchers do not claim the words and ideas of another as their own; they give credit where credit is due. Quotations marks should be used to indicate the exact words of another. *Each* time you paraphrase another author (i.e., summarize a passage or rearrange the order of a sentence and change some of the words), you need to credit the source in the text.

The key element of this principle is that authors do not present the work of another as if it were their own words. This can extend to ideas as well as written words. If authors model a study after one done by someone else, the originating author should be given credit. If the rationale for a study was suggested in the Discussion section of someone else's article, the person should be given credit. Given the free exchange of ideas, which is very important for the health of intellectual discourse, authors may not know where an idea for a study originated. If authors do know, however, they should acknowledge the source; this includes personal communications. (pp. 15-16)

Consult the Writing Center or a recommended guide to documentation and research such as the *Manual of the APA* or the *MLA Handbook for Writers of Research Papers* for guidance on proper documentation. If you still have doubts concerning proper documentation, seek advice from your instructor prior to submitting a final draft.

**Use of Work in Two or More Courses:** You may not submit work completed in one course for a grade in a second course unless you receive explicit permission to do so by the instructor of the second course.

**Penalties for Plagiarism:** Should a faculty member discover that a student has committed plagiarism, the student should receive a grade of 'F' in that course and the matter will be referred to the Honor Council for possible disciplinary action. The faculty member, however, may elect to give freshmen and sophomore students a "zero" for the assignment and to allow them to revise the assignment up to a grade of "F" (50%) if they believe that the student plagiarized out of ignorance or carelessness and not out of an attempt to deceive in order to earn an unmerited grade. This option should not be available to juniors, seniors, or graduate students, who cannot reasonably claim ignorance of documentation rules as an excuse.

**Caution:** Be very careful what you upload to Turnitin or send to your professor for evaluation. Whatever you upload for evaluation will be considered your final, approved draft. If it is plagiarized, you will be held responsible. The excuse that "it was only a draft" will not be accepted.

**Caution:** Also, do not share your electronic files with others. If you do, you are responsible for the possible consequences. If another student takes your file of a paper and changes the name to his or her name and submits it and you also submit the paper, we will hold both of you responsible for plagiarism. It is impossible for us to know with certainty who wrote the paper and who stole it. And, of course, we cannot know if there was collusion between you and the other student in the matter.

**Penalties for Cheating:** Should a faculty member discover a student cheating on an exam or quiz or other class project, the student should receive a "zero" for the assignment and not be allowed to make the assignment up. The incident should be reported to the chair of the department and to the Honor Council. If the cheating is extensive, however, or if the assignment constitutes a major grade for the course (e.g., a final exam), or if the student has cheated in the past, the student should receive an "F" in the course, and the matter should be referred to the Honor Council. Under no circumstances should a student who deserves an "F" in the course be allowed to withdraw from the course with a "W."

**Student Right of Appeal:** Faculty will notify students immediately via the student's TAMIU e-mail account that they have submitted plagiarized work. Students have the right to appeal a faculty member's charge of academic

dishonesty by notifying the TAMIU Honor Council of their intent to appeal as long as the notification of appeal comes within 5 business days of the faculty member's e-mail message to the student. The *Student Handbook* provides details

### **UConnect, TAMIU E-Mail, and Dusty Alert**

Personal Announcements sent to students through TAMIU's UConnect Portal and TAMIU E-mail are the official means of communicating course and university business with students and faculty – not the U.S. Mail and not other e-mail addresses. Students and faculty must check UConnect and their TAMIU e-mail accounts regularly, if not daily. Not having seen an important TAMIU e-mail or UConnect message from a faculty member, chair, or dean is not accepted as an excuse for failure to take important action. Students, faculty, and staff are encouraged to sign-up for *Dusty Alert* (see [www.tamtu.edu](http://www.tamtu.edu)). *Dusty Alert* is an instant cell phone text-messaging system allowing the university to communicate immediately with you if there is an on-campus emergency, something of immediate danger to you, or a campus closing.

### **Copyright Restrictions**

The Copyright Act of 1976 grants to copyright owners the exclusive right to reproduce their works and distribute copies of their work. Works that receive copyright protection include published works such as a textbook. Copying a textbook without permission from the owner of the copyright may constitute copyright infringement. Civil and criminal penalties may be assessed for copyright infringement. Civil penalties include damages up to \$100,000; criminal penalties include a fine up to \$250,000 and imprisonment.

### **Students with Disabilities**

Texas A&M International University seeks to provide reasonable accommodations for all qualified persons with disabilities. This University will adhere to all applicable federal, state, and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal education opportunity. It is the student's responsibility to register with the Director of Student Counseling and to contact the faculty member in a timely fashion to arrange for suitable accommodations.

### **Incompletes**

Students who are unable to complete a course should withdraw from the course before the final date for withdrawal and receive a "W." To qualify for an "incomplete" and thus have the opportunity to complete the course at a later date, a student must meet the following criteria:

1. The student must have completed 90% of the course work assigned before the final date for withdrawing from a course with a "W", and the student must be passing the course;
2. The student cannot complete the course because an accident, an illness, or a traumatic personal or family event occurred after the final date for withdrawal from a course;
3. The student must sign an "Incomplete Grade Contract" and secure signatures of approval from the professor and the college dean.
4. The student must agree to complete the missing course work before the end of the next long semester; failure to meet this deadline will cause the "I" to automatically be converted to a "F"; extensions to this deadline may be granted by the dean of the college.

This is the general policy regarding the circumstances under which an "incomplete" may be granted, but under exceptional circumstances, a student may receive an incomplete who does not meet all of the criteria above if the faculty member, department chair, and dean recommend it.

### **Student Responsibility for Dropping a Course**

It is the responsibility of the STUDENT to drop the course before the final date for withdrawal from a course. Faculty members, in fact, may not drop a student from a course without getting the approval of their department chair and dean.

### **Independent Study Course**

Independent Study (IS) courses are offered only under exceptional circumstances. Required courses intended to build academic skills may not be taken as IS (e.g., clinical supervision and internships). No student will take more than one IS course per semester. Moreover, IS courses are limited to seniors and graduate students. Summer IS course must continue through both summer sessions.

### **Grade Changes & Appeals**

Faculty are authorized to change final grades only when they have committed a computational error or an error in recording a grade, and they must receive the approval of their department chairs and the dean to change the grade. As part of that approval, they must attach a detailed explanation of the reason for the mistake. Only in rare cases would another reason be entertained as legitimate for a grade change. A student who is unhappy with his or her grade on an assignment must discuss the situation with the faculty member teaching the course. If students believe that they have been graded unfairly, they have the right to appeal the grade using a grade appeal process in the *Student Handbook* and the *Faculty Handbook*.

### **Final Examination**

Final Examination must be comprehensive and must contain a written component. The written component should comprise at least 20% of the final exam grade. Exceptions to this policy must receive the approval of the department chair and the dean at the beginning of the semester.