TEXAS A&M UNIVERSITY SAN ANTONIO

Department of Computational, Engineering, and Mathematical Sciences

MATH 3415: Calculus III, Section 001
Fall 2024

Instructor: Dr. Qi Han
Class Meeting: MWF 11am-12:15pm
Classroom: Classroom Hall 303
E-mail: qhan@tamusa.edu
https://apps.tamusa.edu/course-information/my-profile/faculty-Profile.php?ID=358
Office Hours: WF 8-9am, MW 1pm-2pm, and/or via email
                Or by appointment via email, read regularly between 8am~8pm

Credit Hours: 3
Office Phone: (210) 784-2262
Office: Classroom Hall 314P

Course Description and Materials

Catalog description: This course covers sequences and series, functions of several variables, two/three-dimensional geometry, partial derivatives, multiple integrals, line and surface integrals, Green's theorem, Stoke's theorem, and applications.

Prerequisite: MATH 2114 and MATH 2314: Calculus II and its Lab, with a grade "C" or higher.

Required textbook: Essential Calculus, Early Transcendentals by James Stewart (2nd edition)
Cengage with ISBN-13: 978-1-133-11228-0.

Student learner objectives: The course explores the fundamental concepts and principles of real variables analysis, and students who successfully complete the course will:
- Examine functions of several variables, define and compute limits of functions at points, and define and determine continuity.
- Define and compute partial derivatives, directional derivatives and differentials of multivariable functions, and examine conditions of differentiability.
- Find local extreme values of functions of several variables, test for saddle points, examine the conditions for the existence of local and absolute extreme values, solve constraint problems using Lagrange multipliers, and solve related application problems.
- Use rectangular, cylindrical and spherical coordinates systems to define space curves and surfaces in cartesian, parametric and vector forms.
- Integrate functions of several variables.
- Examine vector fields, define and evaluate line integrals using the fundamental theorem of line integrals and Green's theorem, and compute arc length.
- Define and compute the curl and divergence of vector fields, and apply Green's theorem, Stokes's theorem and the divergence theorem to evaluate line integrals, surface integrals and flux integrals.

List of topics: Students who successfully complete this course will be able to demonstrate an understanding and working knowledge of:
1. Calculus with parametric curves (Sections 9.1-9.2);
2. Polar coordinates and applications (Sections 9.3-9.4);
3. Three-dimensional coordinate systems (Section 10.1);
4. Vectors and their dot, cross products (Sections 10.2-10.4);
5. Equations of lines and planes (Section 10.5);

6. Cylinders and quadric surfaces (Section 10.6);
7. Topics on space curves (Sections 10.7-10.9);
8. Functions of several variables (Section 11.1);
9. Limits, continuity, partial derivatives and applications (Sections 11.2-11.4);
10. Chain rule (Section 11.5);
11. Directional derivatives and the gradient vector (Section 11.6);
12. Multi-variable optimization (Sections 11.7-11.8);
13. Double integrals and applications (Sections 12.1-12.4);
14. Triple integrals and applications (Sections 12.5-12.7);
15. Change of variables (Section 12.8);
16[*]. Introduction to vector analysis (Sections 13.1-13.9).
==The instructor reserves the right to modify/update the topics as appropriate.==

NOTE. This class meets three times a week. Aside from the four hours that you spend in class each week, you should expend at least another 4~6 hours to study on your own: reading the book and my lecture notes, working out homework assignments, searching online for interested topics, and solving extra problems for practice etc. You are responsible for any and all materials/topics discussed in my class.

Active learning and Inquiry-based learning: This course implements active learning and inquiry-based learning approaches throughout, and the students are strongly encouraged to preview the teaching materials and be aware of many class participation and self/group study activities.

Course Requirements and Expectations

Examinations: There will be four exams during the entire semester. Students are expected to take all four exams at regularly scheduled class time. Exceptions for a legitimate reason may be granted by and must be approved by the instructor beforehand. Students should notify (or under certain unusual circumstances have other(s) to notify) your instructor formally that you will miss, or have missed an exam, and provide a reason, with the accompanying documents supporting that, for your absence within 24-hrs of the scheduled exam date. Your instructor should be notified by e-mail along with a written notice. Contact your instructor beforehand to make necessary arrangement, should you know in advance that you will be unable to take an exam at the regular class time. Students who fail to follow the prescribed procedure will receive a **GRADE OF ZERO** on the missed exam.

Test 1 covers Chapters 9-10.
Test 2 covers Chapter 11.
Test 3 covers Chapter 12.
Final Exam covers carefully selected topics from Chapters 9~12.

NOTE: The schedules will be announced at least a week ahead of time in class, in Blackboard, and through email. The tests and final exam will be taken in class, possibly with a portion taken home. Calculators, cell phones, laptops, i-pads, kindles, and any other electronic devices are **NOT** allowed during the tests and the final exam. Once found, the tests and the final exam would receive a **ZERO GRADE**. If this happens in a recursive manner, the instructor will report to the university as an academic dishonesty issue.

Final exam schedule is available at
https://www.tamusa.edu/academics/documents/Fall-2024-Final-Exam-Schedule.pdf
For this class, the final exam is scheduled between **10:00am~11:50am, Monday, December 9, 2024**.

Research projects: Towards the end of the semester, students are given a classical research paper to read; each student should write a research report upon reading this paper. The students are not expected to fully understand the research paper, rather are exposed to true mathematical research as a first experience.

Quizzes/Exercises: There are 7 quizzes/exercises on recently covered topics. **NO** make-up please.

Assignments: There are totally 7 Homework Assignments of this class which should be submitted on their due dates. Problems are assigned after each section of the book covered that will be summarized with a HW number posted on Blackboard-Assignment, with its due date specified. Your homework assignments are collected before the end of that day's class. Late homework will **NOT** be accepted. Should you have to miss that day's class, it is solely your responsibility to have your work turned in beforehand in order for it to be graded. If you cannot finish all the questions, please finish as many problems as possible.

Your work should be legible and done neatly. If the work is not presentable or illegible, you will **NOT** receive credit for it. Please staple the sheets of your assignment together in the upper left corner and please do not use papers torn out of spiral bound notebooks. In the upper right corner of your assignment, you should write your name, the class section number, and assignment number (HW1, …, HW7). Discipline yourself to write clear, readable solutions - they will be of great value for review. You need to show both your answer and the work leading to it. **NO** credit for merely having the right answer, but you can have group/team discussions on homework problems. However, you must write up solutions on your own and truly understand the mathematics/algorithms involved. Be mindful of your academic integrity.

Evaluation of student performance: Every student's grade will be based entirely on his/her performance. Students will not compete against one another for grades.

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Grading Policy

HWs: 12%   Exercises: 11%   Research Report: 12%   Tests 1~3: 15% each   Final Exam: 20%

A = 90~100%   B = 80~89.9%   C = 70~79.9%   D = 60~69.9%   F = 0~59.9%

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NOTE: The final grade is a weighted average. Please do **NOT** simply take the average of all grades posted on the blackboard as your final grade. A helpful link is
https://www.indeed.com/career-advice/career-development/how-to-calculate-weighted-average

NOTE: The instructor reserves the right to modify/update the information of this syllabus as appropriate.

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No Use of Generative AI Permitted

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MATH 3415 assumes all students submitted work will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

IMPORTANT POLICIES AND RESOURCES

Academic Accommodations for Individuals with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us https://www.tamusa.edu/Disability-Support-Services/index.html or email us at dss@tamusa.edu. Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services and their instructors as soon as possible.

Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202.

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, call 210-784-1331 or visit Madla 120.
All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information on SCC services visit tamusa.edu/studentcounseling

Crisis support is available 24/7 by calling the SCC at 210-784-1331 (after-hours select option '2').
Additionally, the TELUS Student Support App provides a variety of mental health resources to including support for in the moment distress, an anonymous peer to peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.
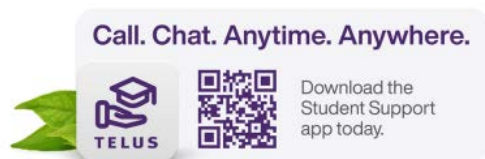
Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: https://tamusa.bbcportal.com/.

More information about Emergency Operations Plan and the Emergency Action Plan can be found here: https://www.tamusa.edu/about-us/emergency-management/.

Download the SafeZone App (https://safezoneapp.com/) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. Tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. Students can schedule appointments through JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. The Center offers face-to-face, synchronous online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at https://www.tamusa.edu/academics/.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a CARE referral (https://www.tamusa.edu/university-policies/Student-Rights-and-Responsibilities/file-a-report.html) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, gender expression, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable accommodations to pregnant students as would be provided to a student with a temporary medical condition that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

<mark>Students' Rights</mark>

1.   A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.

2.   Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.

3.   A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.

4.   Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

<mark>Students' Responsibilities</mark>

1.   A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.

2.   A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, Student Code of Conduct, on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.

3.   A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.

4.   A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.

5.   A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation, or disability. Conduct that infringes on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct (https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/documents/Student-Handbook-2022-23.pdf) or visit the resources available in the OSRR website (https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/academic-integrity.html).

Important Dates:

August 26	First day of class
September 2	Labor Day Holiday
November 11	Last day to drop with an automatic "W"
November 19	Last day to drop a course or withdraw from the University
November 27	Study Day – No classes
November 28-30	Thanksgiving Holiday – No classes
December 5	Last day of classes
December 6	Study Day – No classes
December 7-13	Final exams

The complete academic calendar is available online: https://www.tamusa.edu/academics/academic-calendar/index.html.