Course Syllabus: MATH 2326-002

Calculus III: Fall 2017

Instructor: Li Wang

Office Number: PKH 438 (Pickard Hall)

Email Address: li.wang@uta.edu

Office Hours: Tuesday/Thursday: 10:00am-11:30am or by appointment

Faculty Profile: https://mentis.uta.edu/explore/profile/li-wang

Section Information: MATH 2326-002

Time and Place of Class Meetings: Lecture: PKH 319 Tu/Th 2:00AM - 3:20AM

Description of Course Content: This course focus on the multi-dimensional analysis, as opposed to one-dimensional analysis that you have learned in Calculus I and Calculus II. This semester you will learn such important concepts as a vector, a vector field, vector-valued function, partial derivative, a line integral and multivariable integrals. The ideas of the vector calculus apply to numerous areas of human knowledge such as engineering, physics, pure mathematics, biology and many others.

Prerequisite: C or better in MATH 2425 or HONR-SC 2425.

Student Learning Outcomes: Upon completion of Math 2426, the students should be able to:

(1) Compute the dot products and cross products for vectors in 2 or 3 dimensions; represent the lines and curves in 3 dimensional space; calculate the length of curves.

(2) Understand the function of several variables, typically 2 or 3 variables; know how to represent the planes and surfaces in 3 dimensions; for given equations and inequalities, know how to graph them; calculate the limits of functions with 3 variables; understand the continuity properties of vector-valued functions.

(3) Know how to calculate the partial derivatives for multivariable functions; how to use Chain Rule to calculate the derivative of multivariable functions; understand the directional derivative and the gradient; know how to represent the tangent planes and do linear approximation.

(4) Know how to solve the maximum/minimum problems with 2 or 3 variables by using Lagrange Multipliers.

(5) Understand the geometric meaning of double integrals and triple integrals; know how to calculate double integrals and triple integrals in an efficient way.

(6) Compute the line integrals and surface integrals by applying the Greens Theorems, Stokes Theorem, and the Divergence Theorem.

Required Textbooks and Other Course Materials:

1. Calculus, Early Transcendentals, 2nd edition, by William Briggs, Lyle Cochran, Bernard Gillett, we will cover **Chapter 11-14**.

2. Access to MyLabsPlus (www.uta.mylabsplus.com), the online homework system for this course is required. A handout is posted on Blackboard with instructions. All you need to do is login, enter or buy an access code, and then you are up and running.
3. Calculator (Optional) TI 30 or similar.

Descriptions of major assignments and examinations: There will be two in-class midterm exams, and a departmental final exam. After each lecture, there will be some homework assigned by MyLabsPlus and due in one week.

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 have decided that attendance at all class lectures is required, there will be one attendance check every week, either Tuesday or Thursday, but attendance will not be taken nor directly factored into your grade. Just in case a grade F might be given, for reporting use.** Any student who misses a lecture for any reason is responsible for missed material and missed announcements. 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 Scale: A: 90-100 **B**: 80-89 **C**: 70-79 **D**: 60-69 **F**: 0-59

Grade Components and Major Assignments and Examinations:

Midterm 1: 20% (Week 6, Thursday, Oct 5, 2017)
Midterm 2: 20% (Week 11, Thursday, Nov 9, 2017)
Final Exam: 30% (Week 15, Saturday, Dec 9, 2017 may change)
Online Homework: 30% (MyLabPlus)

Make-up Exams: If you need to do a makeup exam (for example: you have a conflict with either midterm or final; or you need to see a doctor), you must contact your instructor no later than 12 hours before the exam, by providing a necessary document. Only the **official document** will be accepted. Excuse **after the exam** usually will not be considered.

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 on focused course-related activities, including reading the Calculus textbook, completing homework, and 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).** 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.
If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first two weeks of the semester, to make sure you are appropriately accommodated.

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. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@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/.

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. 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.

IDEAS Center: 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. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu 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: The Math Department operates the Math Clinic, a tutoring service staffed by upper level undergraduate students. You will need to show your MavID to use the Math Clinic. There are tables where you may study on your own or quietly with other students. The Math Clinic is on the 3rd floor of Pickard Hall (Room 325); the phone number is 817-272-5674; and the hours of operation for fall are

Monday – Thursday 11:30am – 8:00pm
Friday, Saturday, Sunday Closed

Go to the Math Clinic webpage http://www.uta.edu/math/clinic/ to get more information.

Private Tutor List: The Math Department maintains a list of people who have expressed an interest in tutoring. These persons are not necessarily recommended by the Math Department and they set their own fees. You may obtain a copy of the tutor list in the Math Office.

Course Schedule (Tentative):

Week	Sections	Topics
0	11.1	Introduction about this course; vectors; equal vectors; zero vector; vector addition and subtraction.
1	11.1,11.2,11.3	Properties of vector operations; vectors on plane; vectors in 3 dimensions; distance; sphere; ball; dot product.
2	11.4,11.5,11.6	Cross product; properties of cross product; parametric equation of a line; curves; vector-valued functions; lines and curves in space; limits and continuity; calculus of vector-valued functions.
3	11.6,11.7	Derivative rules for vector-valued functions; definition of indefinite integral of a vector-valued function; definition of definite integral of a vector-valued function; motion in space
4	11.8,11.9,12.1	Arc length for vector functions; arc length of a polar curve; curvature; general equation of a plan in R^3; parallel and orthogonal planes; cylinders and trace
5	12.2,12.3,12.4	Functions of 2 variables; graphs; level curves; functions of 3 variables; level surfaces; calculus of multivariable functions; limits; two-path test for nonexistence of limits; partial derivatives
6	12.4, review for Midterm 1	Partial derivatives; equality of mixed partial derivatives; differentiability; review 11.1-12.4 for midterm 1.
7	12.5,12.6,12.7	Chain rule of one independent variable; Chain rule of two independent variables; Implicit differentiation; directional derivative; Gradient of two dimensions; directions of change; Tangent planes and linear approximation
8	12.8,12.9,13.1	Local Maximum/Minimum values; critical point; saddle point; second derivative test; absolute maximum/minimum values; method of Lagrange Multipliers in two/three variables; double integrals over rectangular regions
9	13.1,13.2,13.3	Double integrals over general regions; changing the order of integration; volumes of regions between two surfaces; double integrals in polar coordinates
10	13.4,13.5,13.7	Triple integrals definition; changing the order of integration; triple integrals in cylindrical and spherical coordinates; Jacobian determinant of a transformation of two/three variables; change of variables for double/triple integrals.
11	Review for Midterm 2	Review sections 12.5-13.7 for Midterm 2.
12	14.1,14.2,14.3	Vector fields; radial vector fields; scalar line integrals in the plane; circulation and flux of a vector field; conservative vector field; test for conservative vector field; fundamental theorem for line integrals; line integrals on closed curves.
13	14.4,14.5,Thanks giving break	Green's Theorem; circulation form; flux form; divergence and curl; curl of a conservative vector field; product rule for the divergence.
14	14.6,14.7, 14.8	Surface integral of scalar-valued functions on parameterized surfaces; evaluation of surface integrals of scalar-valued functions on explicitly defined surfaces; surface integral of a vector field; Stokes' Theorem; Divergence Theorem.
15	Review for final	Review 11.1-14.8

Important Dates (Fall 2017)

Sep 4 (Mon)	Labor Day holiday
Oct 5 (Thu)	Midterm 1, 2:00pm-3:20pm
Nov 9(Thu)	Midterm 2, 2:00pm-3:20pm
Nov 1(Wed)	Last day to drop a class
Nov 23-24 (Thu-Fri)	Thanksgiving Holiday
Dec 6 (Wed)	Last Day of Classes
Dec 9 (Sat)	Final Exam (May change)

Li Wang, who is the instructor of this course, reserves the right to adjust this schedule in any way 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