UTRGV

COURSE SYLLABUS

MATH 2415.05 Calculus III	**Instructor: Roger Knobel**
Fall 2019	Office: EMAGC 3.414
EMAGC 1.414 TR 11:00 a.m. – 12:15 p.m.	Contact: 665-7064, roger.knobel@utrgv.edu
EMAGC 1.422 F 11:00 a.m. – 11:50 a.m.	Office Hours: MW 11:00 – 12:00, TRF 9:30 – 10:45

Course Description

This is a first course in multi-variable calculus, extending concepts of one-variable calculus studied in MATH 2413 Calculus I and MATH 2414 Calculus II. We begin by using a three-dimensional coordinate system, vectors, and vector-valued functions to form a basis for the study of calculus in higher dimensions. Next, the concepts and computation of limits, continuity, partial derivatives, and multiple integrals of functions of two or more variables are developed based on analogous concepts from one variable calculus. Finally, the course ends with a study of vector calculus, including Green's Theorem, the Divergence Theorem and Stoke's Theorem. Applications of partial derivatives, multiple integrals, and vector calculus are introduced throughout the course.

Prerequisite

MATH 2414 Calculus II or equivalent with a grade of C or better. This is enforced.

Student Learning Objectives for the Course

After completing this course students will be able to

1. Analyze and visualize curves, surfaces, and regions in two and three dimensions using Cartesian, polar, cylindrical and spherical coordinate systems.
2. Perform calculus operations of limits, derivatives, and integrals on vector-valued functions.
3. Perform calculus operations of limits, partial derivatives, and multiple integrals on functions of two or more variables.
4. Know and apply the basic theorems of vector calculus, including the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem.
5. Use multivariable calculus to solve and analyze applications in mathematics, science, engineering, and business.

Textbook and Course Materials

- **Textbook**: the OpenStax textbook **Calculus 3**, by Gilbert Strang et. al. found at

  https://openstax.org/details/books/calculus-volume-3

  This book is an open educational resource available for free through the OpenStax website as either an online textbook or downloadable PDF file. Printed copies of the most recent version (March 2016, ISBN13 978-1938168079) can be purchased through the university bookstore or Amazon.com for $33.50 if desired.
- **Calculator**: A basic scientific or non-CAS (must not be capable of performing symbolic algebra or calculus computations) is needed for occasional computation of trigonometric, exponential, and logarithmic values. See more information below. Typical cost is should be $8-15.
- **BlackBoard**: Access to handouts and materials on BlackBoard through http://my.utrgv.edu
- **Online homework system**: Knewton-alta, accessed through your course on BlackBoard. There is a cost of either a single payment of $44 or a monthly subscription of $9.95 per month. Free 14-day Courtesy Access is available, however by the end of the free trial you must purchase the $44 option to continue. Registration and payment options will be available the first time you click on a Knewton assignment in BlackBoard.

Course Work

Daily Reading & Written Homework: Daily assignments will consist of reading from the textbook and written exercises to practice the material. Completing the assignments is the most important part of this course. Expect to spend 8-10 hours each week to complete all assigned reading and work. This written homework will not be collected or graded but will be the basis for quizzes and exams.

Online Homework: Homework will be assigned and graded through the online homework system Knewton alta.

Quizzes: A 5-15 minute quiz will be given each Tuesday and Thursday on material covered the previous class period(s). Quiz exercises will usually be similar to previously assigned written and Knewton homework exercises.

Exams: Four exams will be given during the term and a comprehensive final exam at the scheduled final exam time for our class period.

Grading Policies

The overall course grade is determined by a summary score composed of:

10%	Quiz grade (best 20 quizzes out of at least 23 quizzes, at 5 points each).
10%	Knewton homework grade
15%	Exam 1 grade
15%	Exam 2 grade
15%	Exam 3 grade
15%	Exam 4 grade
20%	Comprehensive final exam grade

The overall course grade will be assigned according to a scale no higher than A(90-100%), B(80-89%), C(70-79%), D(60-69%), F(below 60%).

Late Work and Make-up Policy

No make-up quizzes will be given. Since your best 20 quiz scores will be used to construct your quiz grade, missed quizzes will be given a score of 0 with the expectation that (a) you do not miss many quizzes, and (b) you work diligently to do well on all other quizzes.

Knewton homework should be completed by the given due date. Late submissions will be accepted up to seven days after the due date with a 7% penalty per day. To receive credit for the late work, however, the assignment must be completed entirely before the end of the seven day penalty period.

If you miss an exam, contact me as soon as possible and provide documentation justifying the absence be excused. If I consider your absence to be excused and no other arrangements can be made to reschedule the exam, your final exam score will replace the missed exam; otherwise the missed exam remains a 0. Students missing more than one exam will be dropped from the course.

Drops and Drop Deadline

You may drop course and receive a grade of DR on your transcript provided you do so before the university's November 13th deadline and fall within the 6-drop rule. Please see your academic advisor before dropping a course to discuss the effect it will have on your academic program, as well as UTGRV policies regarding course drops, the three-peat rule, and the 6-drop limit.

Electronic Communication

UTRGV requires all electronic communication between the University and students be conducted through the official University supplied systems. Please use your UTRGV assigned email account for all correspondence with me.

Calculators and Other Electronic Equipment

You may use a basic scientific calculator (e.g. TI-30X, Casio FX-300ES, or equivalent) or basic non-CAS graphing calculator (e.g. TI-84 or equivalent) during quizzes and exams. Not allowed are calculators capable of symbolic calculations such as calculating derivatives and integrals (e.g. TI-Nspire), electronic equipment such as tablets or laptop computers, and cell phones. Please make sure that cell phones are turned off and stored way during class.

Attendance

Attendance is important for success in a mathematics course and students are expected to attend all classes. Students with more than four absences may be dropped from the course. Students arriving late or leaving early without prior arrangements with me may be recorded absent for the day. UTRGV's attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. In these cases contact me in advance to make arrangements regarding missed work or exams.

Students with Disabilities

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact **Student Accessibility Services (SAS)** as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who experience a broken bone, severe injury, or undergo surgery during the semester are eligible for temporary services.

Pregnancy, Pregnancy-related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

Student Accessibility Services:

Brownsville Campus: Student Accessibility Services is located in 1.107 in the Music and Learning Center building (BMSLC) and can be contacted by phone at (956) 882-7374 or via email at ability@utrgv.edu.

Edinburg Campus: Student Accessibility Services is located in 108 University Center (EUCTR) and can be contacted by phone at (956) 665-7005 or via email at ability@utrgv.edu.

Mandatory Course Evaluation Period.

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

Module 1	October 2nd – 8th
Module 2	November 27th – December 3rd
Full Fall Semester	November 14th – December 4th

Scholastic Dishonesty

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to Student Rights and Responsibilities.

Sexual Misconduct and Mandatory Reporting

In accordance with UT System regulations, your instructor is a "Responsible Employee" for reporting purposes under Title IX regulations and so must report to the Office of Institutional Equity & Diversity (oie@utrgv.edu) any instance, occurring during a student's time in college, of sexual misconduct, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like confidential assistance, or have questions, they can contact OVAVP (Office for Victim Advocacy & Violence Prevention) at 665-8287, 882-8282, or OVAVP@utrgv.edu.

Student Services

Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor's office hours. University Resources include the Advising Center, Career Center, Counseling Center, Learning Center, and Writing Center. The centers provide services such as tutoring, writing help, critical thinking, study skills, degree planning, and student employment. Locations are:

Center Name	Brownsville Campus	Edinburg Campus
Advising Center AcademicAdvising@utrgv.edu	BMAIN 1.400 (956) 665-7120	ESWKH 101 (956) 665-7120
Career Center CareerCenter@utrgv.edu	BCRTZ 129 (956) 882-5627	ESSBL 2.101 (956) 665-2243
Counseling Center Counseling@utrgv.edu	EUCTR 109 (956) 665-2574	BSTUN 2.10 (956) 882-3897
Learning Center LearningCenter@utrgv.edu	BMSLC 2.118 (956) 882-8208	ELCTR 100 (956) 665-2585
Writing Center WC@utrgv.edu	BUBLB 3.206 (956) 882-7065	ESTAC 3.119 (956) 665-2538

Selected Dates

The UTRGV academic calendar can be found at https://my.utrgv.edu/home at the bottom of the screen, *prior to login*. Some important dates for Fall 2019 include:

August 26	First day of classes
August 29	Last day to add a course or register for Fall 2019
September 2	Labor Day Holiday – NO classes
November 13	Last day to drop a course; will count toward the 6-drop rule
November 28 - 29	Thanksgiving Holiday – NO classes
December 5	Study Day – NO classes
December 6 - 12	Final Exams
December 13 - 14	Commencement Exercises

Calendar and Tentative Course Schedule:

Day	Date	Textbook Section	Topics and Activities:
Tue	Aug 27	2.1	Course introduction. Vectors in the plane.
Thu	Aug 29	2.2	Three dimensional rectangular coordinates and vectors.
Fri	Aug 30	2.3	The dot product of two vectors.
Tue	Sep 3	2.4	The cross product of two vectors.
Thu	Sep 5	2.5	Equations of lines and planes in three-dimensional space.
Fri	Sep 6	3.1	Vector-valued functions and space curves.
Tue	Sep 10	3.2	Calculus of vector-valued functions.
Thu	Sep 12	3.3	Arc-length and curvature
Fri	Sep 13	3.4	Motion in space
Tue	Sep 17	2.6	Quadratic surfaces in three-dimensional space.
Thu	Sep 19		**Test 1**
Fri	Sep 20	4.1	Functions of several variables.
Tue	Sep 24	4.2	Limits and continuity of functions of several variables.
Thu	Sep 26	4.3	Partial derivatives.
Fri	Sep 27	4.4	Tangent planes and linear approximations.
Tue	Oct 1	4.5	The multivariable chain rule.
Thu	Oct 3	4.6	Directional derivatives and gradients.
Fri	Oct 4	4.7	Optimization problems.
Tue	Oct 8	4.8	Lagrange multipliers
Thu	Oct 10	5.1	Double integrals over rectangular regions.
Fri	Oct 11	5.2	Double integrals over general regions.
Tue	Oct 15		**Test 2**
Thu	Oct 17	5.3	Double integrals in polar coordinates.
Fri	Oct 18	5.4	Triple integrals in rectangular coordinates.
Tue	Oct 22	2.7, 5.5	Cylindrical coordinates and triple integrals
Thu	Oct 24	2.7, 5.5	Spherical coordinates and triple integrals
Fri	Oct 25	5.6	Applications of multiple integrals.
Tue	Oct 29	5.7	Change of variables in multiple integrals.
Thu	Oct 31	6.1	Vector fields.
Fri	Nov 1	6.2	Line integrals.
Tue	Nov 5		**Test 3**
Thu	Nov 7	6.3	Conservative vector fields.
Fri	Nov 8	6.4	Green's Theorem.
Tue	Nov 12	6.5	Divergence and curl.
Thu	Nov 14	6.6	Surface integrals.
Fri	Nov 15	6.7	Stoke's Theorem
Tue	Nov 19	6.8	The Divergence Theorem
Thu	Nov 21		Finish any remaining work.
Fri	Nov 23		Finish any remaining work.
Tue	Nov 26		**Test 4**
Thu	Nov 28		**No Class – Thanksgiving Holiday**
Fri	Nov 29		**No Class – Thanksgiving Holiday**
Tue	Dec 3		Finish any remaining work. Last day of class
Mon	Dec 9		**Final Exam 10:15 a.m. – 12:00 p.m.**