MATH 2415 CALCULUS OF SEVERAL VARIABLES

Syllabus-Spring 2021

Class Information:

Class Section	Days	Time	Instructor
MATH 2415.001	Tue, Thu	8:30-9:45am	Baris Coskunuzer
MATH 2415.002	Tue, Thu	10:00am-11:15am	Baris Coskunuzer
MATH 2415.003	Tue, Thu	11:30am-12:45pm	Changsong Li
MATH 2415.004	Tue, Thu	2:30pm-3:45pm	Changsong Li
MATH 2415.005	Tue, Thu	4:00pm-5:15pm	TBA

Course Description: The course covers differential and integral calculus of functions of several variables. Topics include vector valued and scalar functions, partial derivatives, directional derivatives, chain rule, Lagrange multipliers, multiple integrals, the line integral, Green's theorem, Stokes' theorem, divergence theorem.(3 lecture hours and 2 problem section hours per week; 4 semester credit hours).

Pre-Requisite: A grade of C- or better in MATH 2414 or equivalent.

Co-requisites: Students must enroll in one of the problem section MATH 2415.30x in addition to a lecture section MATH 2415.00x. Problem sections meet on each Friday. Students are automatically enrolled in MATH 2415.701 exam section which meets in exam days only.

Textbook: We use **Calculus**, *Early Transcendentals*, 8^{th}*edition* by James Stewart. We will cover the following sections of the textbook:
12.1-12.6, 13.1-13.3, 14.1, 14.3-14.8, 15.1-15.3, 15.6-15.9, 16.1-16.7, and 16.8-16.9.

WebAssign: You MUST have **WebAssign** access as the weekly digital homework (DHW) will be assigned on WebAssign. WebAssign also contains electronic version of the textbook. You should purchase an access code for this text to create an account or to add this course in your existing account. Here are some options for purchasing the access code:

1. Multi-term WebAssign printed access card(contains ebook): ISBN: 9781337771504
2. Bundle: Loose-leaf textbook+multi-term WebAssign access: ISBN: 9781305710306
3. Bundle: Hardcover textbook+multi-term WebAssign access: ISBN: 9781305709379
4. Cengage Unlimited: ISBN: 9780357700006 (4-month access), ISBN: 9780357700013 (12-month access), ISBN: 9780357700020 (24-month access).

Course Webpage / eLearning: You must regularly check the MATH 2415.701 (the exam section) page of eLearning: `https://elearning.utdallas.edu`

Paper Homework (PHW), grades, and important announcements will be posted under the course MATH 2415.701 on eLearning. You will also access WebAssign for Digital Homework (DHW) through the course MATH 2415.701 on eLearning.

PLTL Program: Peer-Led Team-Learning (PLTL) sessions are available for MATH 2415. More details will be posted on eLearning in about the second week of the semester.

`http://www.utdallas.edu/studentsuccess/help-with-courses/peer-led-team-learning/`

Grading Scheme

Synchronous Students:

3 x 15% Midterm Exams, 25% Final Exam, 15% Digital HW, 15% Problem Session

Asynchronous Students:

3 x 15% Midterm Exams, 25% Final Exam, 15% Digital HW, 15% Paper HW

1. **Digital Homeworks (DHW):**
   - Weekly Digital Homework (DHW) will be made available in WebAssign (see instructions below) every Tuesday and will be due Monday midnight in the following week.
   - There will be 11 DHWs throughout the semester. Lowest DHW score will be dropped at the end of the semester.
   - DHWs are worth 15% toward the final grade.
2. **Paper Homeworks (PHW):**
   - A pdf file of weekly Paper Homework (PHW) will be posted each week on eLearning. Each PHW will cover content on earlier Thursday and last Tuesday class.
   - PHWs will not be collected for synchronous students. Instead, there will be a short quiz in problem sessions containing 1-2 problems very similar to PHW.
   - PHWs will be due by Thursday midnight for asynchronous students. The submission instructions will be given later.
   - Each PHW will be graded out of 15 points. There will be 11 PHWs throughout the semester. Lowest PHW score will be dropped at the end of the semester.
   - PHWs are worth 15% toward the final grade for asynchronous students.
3. **Problem Sessions:**
   - Synchronous students must attend live Problem Sessions. Asynchronous students will be able to watch the recording of the problem sessions.
   - In the first hour, TAs will solve problems on sections covered earlier Thursday, and the last Tuesday class. This part will be recorded.

- There will be a 15 minute quiz during the Problem Sessions. The quiz problems will be very similar to 1-2 PHW problems. The cameras will be on during quizzes. Quizzes can start anytime during the problem sessions.
- In the second half of the problem sessions, the students will actively solve problems in small groups. The content will be that week's classes. TA will grade you for active participation in this part.
- Each Problem Session, you will be graded out of 15 points. 10 points will be your quiz score, 5 points will be your participation to problem session.
- There will be 11 graded PSs, and 4 ungraded PSs throughout the semester. Lowest Problem Session score will be dropped at the end of the semester.
- Problem Sessions are worth 15% toward the final grade for synchronous students.

4. **Mid-Term Exams:**
   - Exam I: February 16, Friday 7:00pm-8:30pm;
   - Exam II: March 12, Friday 7:00pm-8:30pm;
   - Exam III: April 16, Friday 7:00pm-8:30pm;
   - Each midterm exam counts 15% toward the final grade.
5. **Final Exam**
   - Time: TBA between May 10-15.
   - Final exam will count as 25% towards your final grade.

Late/Missed Coursework: There is no make-up for late or missed assignments, quizzes, or exams, unless extreme circumstances with proper documentation accepted by the instructor.

Calculators: Calculators are not allowed in the exams and quizzes. The exams will involve simple calculations so that you will not need a calculator.

MATH 2415 WebAssign Instructions: To gain access to WebAssign:

1. Log into eLearning, and select the course **MATH 2415.701**
2. Click the link on the eLearning course homepage entitled **"Access WebAssign"**.
3. If you already have a WebAssign account, you will either see the course **MATH 2415.701-Calculus of Several Variables -S20** or can choose it from the pull-down menu.
4. If you do not already have a WebAssign account, you will have 3 options to register.
   - Enter an access code if you have already purchased it.
   - Purchase the access onsite using a credit card/bank account.
   - Continue the **trial period** (expiration date will be given in red).

Once you have registered, you should be taken to the WebAssign course **MATH 2415.701**.

Student Learning Outcomes:

1. Students will be able to calculate the dot, cross, and triple product of vectors and apply those products to calculate the angle between two vectors, area of triangle and parallelogram, and volume of a parallelepiped. Students will also be able to find vector and scalar projection of a vector into another vector.

2. Given an algebraic or parametric or vector equation, the students will be able to determine the graph in space as a line or a plane or a quadric surface, or a space curve and graph it.

3. Students will be able to graph, calculate partial derivatives, and find the relative/absolute extrema (if any) of a given function of two variables.

4. Students will be able to solve the constrained optimization problems using the Lagrange multiplier.

5. Students will be able to find the gradient and the directional derivative of scalar functions of 2 and 3 variables. Students will also be able to find the maximum and minimum rate of change in the scalar function and the corresponding directions.

6. Students will be able to compute double integrals in cartesian coordinates over rectangular regions and general regions of type I and type II. Students will also be able to compute double integrals in polar coordinates and simple triple integrals in cylindrical and spherical coordinates.

7. Students will be able to calculate the area of a fence and work done by a force as line integrals of a scalar function and force vector field over a piece-wise smooth curve.

8. Students will be able to calculate and interpret the curl and divergence of a vector function.

9. Students will be able to calculate the line integrals of a vector field along a closed curve using Green's theorem.

UT Dallas Syllabus Policies and Procedures:

The information at the following website constitutes university's syllabus policies and procedures segment of this syllabus.

`http://go.utdallas.edu/syllabus-policies`

Tentative Schedule

Monday	Tuesday	Thursday	Friday
Jan 18th **1**	19th **2** Sec 12.1-2	21st **3** Sec 12.3	22nd **4** PS*
25th **5** DHW-1 Due	26th **6** Sec 12.4	28th **7** Sec 12.5	29th **8** PS-1
Feb 1st **9** DHW-2 Due	2nd **10** Sec 12.5-6	4th **11** Sec 13.1	5th **12** PS-2
8th **13** DHW-3 Due	9th **14** Sec 13.2-3	11th **15** Exam I Review	12th **16** PS-3 & Exam I
15th **17**	16th **18** Sec 14.1	18th **19** Sec 14.3-4	19th **20** PS*
22nd **21** DHW-4 Due	23rd **22** Sec 14.5	25th **23** Sec 14.6	26th **24** PS-4
Mar 1st **25** DHW-5 Due	2nd **26** Sec 14.7	4th **27** Sec 14.7	5th **28** PS-5
8th **29** DHW-6 Due	9th **30** Sec 14.8	11th **31** Exam II Review	12th **32** PS-6 & Exam II
15th **33**	16th **34** Sec 15.1	18th **35** Sec 15.2	19th **36** PS*
22nd **37** Spring Break	23rd **38** Spring Break	25th **39** Spring Break	26th **40** Spring Break
29th **41** DHW-7 Due	30th **42** Sec 15.3	Apr 1st **43** Sec 15.6	2nd **44** PS-7
5th **45** DHW-8 Due	6th **46** Sec 15.7	8th **47** Sec 15.8	9th **48** PS-8
12th **49** DHW-9 Due	13th **50** Sec 15.9	15th **51** Exam III Review	16th **52** PS-9 & Exam III
19th **53**	20th **54** Sec 16.1	22nd **55** 16.2	23rd **56** PS*
26th **57** DHW-10 Due	27th **58** Sec 16.3-4	29th **59** Sec 16.5	30th **60** PS-10
May 3rd **61** DHW-11 Due	4th **62** Sec 16.6-7	6th **63** Sec 16.8-9	7th **64** PS-11