Math 2415, Fall 2020

Calculus of Several Variables
Remote/Virtual Learning

Course Information

Class #	Class Title	Day	Time	Room	Instructor
80331	Math 2415.001	TuTh	1:00pm - 2:15pm	ONLINE	Li
80411	Math 2415.002	TuTh	11:30am - 12:45pm	ONLINE	Li
80592	Math 2415.003	TuTh	2:30pm-3:45pm	ONLINE	Zweck
80682	Math 2415.004	TuTh	4:00pm - 5:15pm	ONLINE	Zweck
87548	Math 2415.005	TuTh	8:30am - 9:45am	ONLINE	Coskunuzer

Instructors' Contact Information

Name	**Baris Coskunuzer**	**Changsong Li**	**John Zweck**
Email	Baris.Coskunuzer@utdallas.edu	changsong.li@utdallas.edu	zweck@utdallas.edu
Office	FA 2.410	FO 2.108	FO 3.704J
Phone	972-883-4636	972-883-6034	972-883-6699
Office Hours	TuTh 10-11:30am & by appt	By appt	W 4-5pm & by appt
Modality	MS Teams	MS Teams	MS Teams

Course Coordinator: John Zweck

WebAssign Contact: Questions about WebAssign should be directed to Dr. Changsong Li at changsong.li@utdallas.edu.

Office Hours: If you cannot make it to office hours *please* contact your instructor in class or by email to set up a time to meet.

Other Info: **All email correspondence with your instructor must be sent to the email address above from your utdallas.edu account.**

Course Pre-requisites and Co-requisites

Pre-requisites: A grade of C− or better in MATH 2414 or equivalent

Preparation: In general, success in Math courses strongly depends on your grade in previous relevant courses. *For Math 2415, the material in Math 2413 is much more important than that in Math 2414.* See Brushing Up on Single Variable Calculus at bottom of course web page.

Co-requisite: Students *must* be enrolled in one of the following **problem sections**:

Class #	Class Title	Day	Time	Room
80373	Math 2415.301	Friday	8:00am - 9:50am	ONLINE
80374	Math 2415.302	Monday	8:00am - 9:50am	ONLINE
80459	Math 2415.303	Monday	8:00am - 9:50am	ONLINE
80412	Math 2415.304	Friday	8:00am - 9:50am	ONLINE
80413	Math 2415.305	Friday	3:00pm - 4:50pm	ONLINE
80414	Math 2415.306	Friday	8:00am - 9:50am	ONLINE
80415	Math 2415.307	Friday	1:00pm - 2:50pm	ONLINE
80593	Math 2415.308	Friday	3:00pm - 4:50pm	ONLINE
80624	Math 2415.309	Friday	8:00am - 9:50am	ONLINE
80683	Math 2415.310	Friday	10:00am - 11:50am	ONLINE
80684	Math 2415.311	Friday	1:00pm - 2:50pm	ONLINE
80685	Math 2415.312	Friday	3:00pm - 4:50pm	ONLINE

TA Info: Graduate Teaching Assistant and Undergraduate Learning Assitant Contact Info.

Co-requisite: Students *must* be enrolled in the following **exam section** (see below for exams dates):

80372 Math 2415.701 F 7-8:15 pm ONLINE

Course Modality and Expectations

Instructional Mode: Remote synchronous online learning at the day and time of the class.

Course Platform for Lecture Sections: Students will participate in the online lectures using **MS Teams** within the eLearning Lecture Course for their section. For example, Dr Li's TuTh 1pm class will access the online lectures through the **eLearning Lecture Course MATH 2415.001**. General instructions for accessing a course meeting in Teams are here. Online lectures will be recorded for later viewing in **MS Streams**. These recordings will be particularly important to students participating asynchronously. General instructions for accessing lecture recordings in MS Streams are here. Students needing *closed captioning* can turn them on within Teams. Captions will also be available in the Streams videos.

Course Platform for Problem Sections: Students will access their problem sections using **Blackboard Collaborate** within the eLearning Problem Session Course for their section. For example, students enrolled in MATH 2415.301 will access the online lectures through the **eLearning Problem Section Course MATH 2415.301**. The only part of the problem section that will be recorded and available in MS Streams will be the 10 minute discussion of the concept quiz.

Students will receive an email prior to their first lecture and problem section meetings with specific instructions for how to join. A basic introduction to eLearning for students is here. We recommend you use a *Chrome or Firefox browser* to access eLearning.

Expectations:

1. You are expected to adhere to the **14-day Assessment Cycle** described later in this syllabus, which is designed to gradually increase your ability to produce independent work in the subject.

2. To gain proficiency in this subject you will need to develop a **conceptual understanding** of the course material in order to solve problems. Therefore you are expected to **actively engage with the lecture material** as presented by your instructor. In particular, each week you will take a quiz designed to assess your conceptual understanding.

3. You are expected to **participate in active learning in your Problem Section** (either synchronously or asynchronously). In particular, you will be assessed on the degree to which you (a) solve assigned problems in collaboration with fellow students, (b) engage in mathematical reasoning, and (c) explain your thinking to each other and your Teaching Assistant.

4. To submit written assignments and communicate mathematical ideas with your instructor, TA, and fellow students, at a minimum you will need to create scanned pdfs of handwritten documents that can be uploaded or emailed, and you will need to be able to write on a digital white board from within eLearning. For these, we strongly recommend the methods described here.

5. This course will use Honorlock, an online exam proctoring tool, which will be integrated with the exam system in eLearning and is provided free of charge to students by UT Dallas. To successfully take an exam, you need a web camera, a microphone, a laptop or desktop computer (no tablets/phones, but chromebooks work), the Chrome browser, a reliable internet connection, and your photo ID. As soon as possible, students are strongly encouraged to ensure that their computer has the minimum requirements for Honorlock, including the built-in or external webcam. You will be prompted to install the Honorlock Chrome Extension (which you can remove after you finish the test). You will then access the exam within your eLearning course and go through the authentication process. The web camera will monitor you throughout your test. Please see the Support Information for additional information, and contact your course instructor if you cannot procure the minimum required technology. We will provide students with the opportunity to do a mock test using Honorlock prior to the first time we use it for assessment. You will need to **study for the exams just as rigorously as if the exams were traditional in-person exams**. Specific activities in the Problem Sections will help you prepare for exams and advice will be given to help you maximize the effectiveness of your own study skills and practices.

6. *The MATH 2415 instructional team understands that we are living in an exceptional time and that during the semester you may encounter challenges that prevent you from performing at your best. We will endeavor to adjust assessment due dates for individual students in as flexible and equitable manner as possible. Nevertheless, all students are expected to complete all assigned work.*

Asynchronous Learning Guidelines: Asynchronous participation means that you are not participating in the course at the same time as the instruction of the course.

1. Students who choose the asynchronous option must still meet the expectations described above and must adhere to the 14-day assessment cycle and the exam policies for the course.

2. At any time in the semester you may elect to switch from a synchronous to an asynchronous mode of participation, or vice-a-versa. **You may participate in your Lecture Section using a different modality than in the Problem Section.** For example, you may participate in the Problem Section synchronously and in the Lecture Section asynchronously.

3. Students who decide to participate asynchronously in the Lecture (or Problem) Section **must immediately inform their instructor (or TA) when they switch.** Similarly students who switch back to the synchronous mode must inform the same person. This is particularly important for the Problem Sections to ensure that your active participation grade is correctly recorded.

4. The synchronous lectures will be recorded and posted by your instructor in your eLearning Lecture Section Course, MATH 2415.00X. Students participating asynchronously are expected to view these lectures and ask clarifying questions of their instructor by email.

5. In the first 15 minutes of each synchronous Problem Section, the TA will go over the solutions to the Conceptual Quiz. This discussion will be recorded and posted by your TA in your eLearning Problem Section Course, MATH 2415.3YY. Students participating asynchronously are expected to view these recordings and ask clarifying questions of their TA by email.

6. For the remainder of the online synchronous Problem Section students will actively solve problems in small groups and be assessed on their Active Participation (**AP**) . These discussions will not be recorded. Instead students participating asynchronously will solve the same problem sets and be assessed on their Active Participation while doing so using a **Graded Discussion Forum** in your eLearning Problem Section Course, MATH 2415.3YY.

7. Because we **learn mathematics best by doing it in a supportive environment**, the Problem Sections for this course employ an active learning method in

which you will work problems while receiving guidance from the TA and your fellow students. Students who select the asynchronous option will engage in active learning through the Graded Discussion Forum mentioned above. In this forum students will (a) solve assigned problems in collaboration with fellow students, (b) engage in mathematical reasoning, and (c) explain their thinking to each other and the Teaching Assistant. The same problem sets will be used for synchronous Problem Sections and the equivalent asynchronous Discussion Forums. The Active Participation (**AP**) portion of your course grade will be assigned using the same method for both the synchronous and asynchronous modalities. The main difference between the two modalities is how students will interact with each other and the TA. With the **synchronous method**, small groups of students will work together in real time to solve problems by talking with each other and writing on a common virtual white board. With the **asynchronous method**, students will share their work with each other and the TA in the Graded Discussion Forum. They will upload scanned pdfs of handwritten partial/complete solutions of the problems, to be accompanied by concise explanations of their solutions either in writing, or via an audio or video recording. Just as with the synchronous method, students are expected to offer suggestions for how to improve/complete each others initial attempts at the problem. TA's will ask "why" questions to encourage students to delve deeper. Just as with the synchronous method, students will only receive full credit for their AP grade each week if they explicitly engage in mathematical reasoning, explain their thinking to each other, and attempt to respond to probing questions by the TA. See slides 4 and 5 of this pdf for more details.

8. While the course is designed under the assumption that students may need to participate asynchronously, the synchronous option will provide you with additional enrichment opportunities. For example, students who participate in the Lecture Section synchronously can ask/answer questions and obtain **immediate feedback** from their instructor **in real time**. Students who participate in the Problem Section synchronously will engage in **real time mathematical discussions** with their fellow students, their graduate TA, and an Undergraduate Learning Assistant who has recently taken the course.

COVID-19 Guidelines and Resources

The UT Dallas Syllabus Policies and Procedures for Fall 2020 include COVID-19 resources for students. In particular, we emphasize the following items from these policies.

Class Attendance: The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected regardless of course modality. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes. These attendance requirements will not be used as part of grading during the Fall 2020 semester (see Class Participation below for grading information).

Class Participation: Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade in

the course is directly tied to class participation. It also includes students engagement in group or other activities during class that solicit feedback on homework assignments, readings, and/or materials covered in the lectures and/or labs. Class participation is documented by faculty. Successful class participation is defined as consistently adhering to University requirements, as presented in the syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings: The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Course Materials

Announcements: We will communicate with you regularly using a class email list and the announcements section of the **MATH 2415.701** eLearning Course.

Webpage: We maintain a web page for the course, linked from Dr. Zweck's web page https://personal.utdallas.edu/~jwz120030. *Bookmark it!* All course materials (except digitial homework, quizzes, and exams) will be posted on this web page, and are publicly available.

eLearning: The course material housed solely on eLearning is not publicly available.

1. eLearning Course **MATH 2415.701** will be used to administer quizzes and exams, post grades, and provide access to WebAssign for digital homework and for the online version of the textbook.
2. eLearning Course **MATH 2415.00X** will be used for synchronous lectures, and to post recordings of lectures and other instructor-specific course materials.
3. eLearning Course **MATH 2415.3YY** will be used for synchronous problem sections, to **submit paper homework**, and to post recordings of discussions of quiz solutions and other TA-specific course materials.

UTD Policy: The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Course Description

Continuation of the Math 2413, 2414 sequence. 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, double and triple integrals, the line integral, Green's theorem, Stokes' theorem, Divergence theorem.

Student Learning Outcomes

See separate document Math 2415 Learning Outcomes on the course web page.

Required Textbooks and Materials

Text: "Calculus (Early Transcendentals)", Eighth Edition, by James Stewart, Chapters 12-16. (Do *not* purchase the 7th edition!) A less expensive Electronic Version is also available. You must have **WebAssign** access. Some Options:

1. Access code to Enhanced WebAssign (contains digital copy of the text) ISBN: 9781285858265
2. Loose leaf copy of the text bundled with Enhanced WebAssign access code ISBN: 9781305616691
3. Hardbound text bundled with Enhanced WebAssign access code ISBN: 9781305597624

Material Covered: The course 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 (to the extent that time permits) 16.8-16.9.

Academic Calendar and Assignments

The **Course Schedule, Paper Homework and Problem Section Assignments** are available on the course web page. In addition, there is a large collection of Past Exams on the course web page, most with complete solutions. **Paper homework** will be submitted to your **eLearning Problem Section Course MATH 2415.3YY.** Weekly **Digital Homework Assignments (WebAssign)** and all quizzes and exams must be accessed via the **eLearning Course MATH 2415.701.**

14 day Assessment Cycle

Here is a 14 day activity/assessment cycle. The first cycle starts on the first Thursday of the semester. Two consecutive cycles overlap. The Problem Sessions on Mondays will always cover the same material as is covered on the previous Friday. To keep all sections

in sync, **there will not be a problem session on Monday Aug 17th (1st day of semester).** Instead, students whose Problem Sections are on Mondays will complete the problem session that would normally fall on **Monday Sep 7th (Labor Day Holiday)** using the asynchronous modality described above.

In the **Problem Sections for Fri Aug 21 and Mon Aug 24**, you will have an introduction to the active learning method we will use, learn how to communicate mathematical ideas within the eLearning environment, participate in a Syllabus Scavenger Hunt, and do a set of diagnostic exercises to review pre-requisite material.

#	Day	Activity	Comments
1	Thursday	Lecture	-
2	Friday	-	-
3&4	Weekend	-	-
5	Monday	-	-
6	Tuesday	Lecture *Paper/Digital Homework Posted*	 *By 11:59pm*
7	Wednesday		
8	Thursday	Concept Quiz	20 mins between 6pm & 11:59pm
9	Friday	Problem Sections *Asynchronous Discussion Forum*	Go over CQ; Active Learning *Opens 8am*
10&11	Weekend		
12	Monday	Problem Sections *Asynchronous Discussion Forum*	Go over CQ; Active Learning *Closes 8pm*
13	Tuesday	Digitial Homework	Due 11:59pm
14	Wednesday	Paper Homework	Due 11:59pm

Midterm Exams: There will be two midterm exams, each 90 minutes to be taken within a 2 hour window.

- Midterm I: Exam window opens on Friday Sep 25th at 7:00pm and closes at 9:00pm. Sections covered: 12.1-12.6, 13.1-13.3 (excluding curvature), 15.7 (cylindrical coordinates only), 15.8 (spherical coordinates only).
- Midterm II: Exam window opens on Friday Oct 30th at 7:00pm and closes at 9:00pm. Sections covered: 14.1, 14.3-14.8, 15.1-15.3.

Final Exam: The final will be based on the whole course and will be 3 hours to be taken within a 4 hour window starting on Friday Dec 4th at 1:00pm.

More Info: Also see more info on exams in the sections on Course Modality and Expectations, Grading Policy, and Instructor Policies.

PLTL Program

Peer-Led Team-Learning (PLTL) sessions are available for MATH 2415 and are run by the Student Success Center. You can pre-register for F20 PLTL Lottery! More info on course web page.

Grading Policy

Grades will be assigned based on the ranges given below using interval notation. The course coordinator in collaboration with the course instructors reserves the right to slightly decrease these ranges. **There will be no extra credit.**

A^+	A	A^-	B^+	B	B^-	C^+	C	C^-	D	F
[97,100]	[92,97)	[90,92)	[86,90)	[79,86)	[77,79)	[75,77)	[67,75)	[64,67)	[55,64)	[0,55)

Grades: Concept Quizzes (**CQ**) 10%, Active Participation in Problem Sections (**AP**) 10%, Digital Homework (**DH**) 15%, Paper Homework (**PH**) 15%, Midterm I 15%, Midterm II 15%, Final 20%.

Concept Quizzes (CQ): Each week you will do an online, automatically graded quiz, due prior to the Problem Sections. The quizzes will be open book and will be available in the eLearning course MATH 2415.701 on Thursdays between 6pm and 11:59pm. You have 20 mins to complete the quiz once you have started. One question will be presented at a time. There will be no backtracking allowed. You have 1 attempt only. The questions will not involve detailed calculations of an algorithmic, "apply this method" nature. Rather they will be designed to test the degree to which you have engaged with the *conceptual material discussed in the lectures*. There will be about 4 questions per week, which will typically be T/F, multiple answer, or multiple choice. The purpose of these weekly, low-stakes quizzes is to make sure you have understood the concepts discussed in class before applying them yourselves to solve problems in the Problem Sections. **Your lowest two quiz scores will be dropped.** Solutions to the quiz will be discussed in the first 10 minutes of your Problem Section.

Active Participation (PS): Ten percent of your final grade will be assigned by the Teaching Assistant based on the degree to which you *actively* participate in the Problem Sections. Read the Handout for Students on how the Problem Sections will be conducted synchronously using the Online White Boards Method and asynchronously using Discussion Forums. For each problem session you can earn a maximum of 5 points. You will receive 1 point if you make a good faith attempt at least half the assigned problems, 1 more point if you attempt at least 3/4 of the problems, 1 point for engaging in mathematical reasoning, and 2 points for the degree to which you explain your thinking to other students and the TA's.

Digital Homework (DH): Each problem on the Digital Homework (WebAssign) is worth 5 points. Students will have three attempts, with a maximum score of 5/5 for the first and second attempts and a maximum score of 3/5 for the third attempt. You

will be able to submit each part of a multi-part question separately. Therefore, if you get a part correct by the second attempt then you get full credit for that part. You may ask your instructor and the graduate TA's questions about the digital homework. **Your lowest two digital homework grades will be dropped.**

Paper Homework (PH): You may ask your instructor and the graduate TA's questions about the paper homework and you may collaborate with another student in the class. However the final write up must be your own. **Your lowest two paper homework grades will be dropped.** Please follow these guidelines for how to prepare your homework for submission in your MATH 2415.3XX eLearning course.

Exams: All exams will be timed and must be completed in one sitting within a specified time window. **You will need to study for the exam as if it were a traditional in-person, closed book exam.** The exams will be proctored using the online exam proctoring service Honorlock. We will use the whitelisted websites feature of Honorlock to provide an approximately one-page formula sheet for each exam, which will be shared with students ahead of time. Other than that, the exam will be closed book, closed notes, closed internet, and you are not permitted to use any sort of calculating device or to communicate with any other people while taking the exam. In addition, **you may not discuss the exam with any other person until your exam score is posted in eLearning.** The exams questions will not be taken from existing sources available on the internet. They will be worded so that putting the question straight into google will not lead you to an answer. You should expect at least some of the questions that to be more conceptual than algorithmic. The questions will be presented to you one at a time. You must submit your answer to the first question before being allowed to proceed to the second question, and so on. There will be no backtracking allowed. For each concept/topic to be examined we will create several problems of comparable difficulty, and each student will be assigned a randomly chosen problem from among these options. The order in which the questions are presented will be randomized. For each question we will give you a guide as to how long that question might be expected to take so that you can pace yourself. Answers will be multiple choice, multiple answer, T/F, enter numeric value, or provide a complete written solution. Most of the questions will be automatically graded in eLearning, but a few will require you to show all your work and will be manually graded. *We may require students to upload scans showing their complete hand written solutions to all questions, including those that are multiple choice, multiple answer, T/F, enter numeric value.*

Instructor Policies

Attendance

Regular and punctual attendance in Lectures and Problem Sections is strongly encouraged for those participating synchronously. An informal study by the UTD Department of Mathematical Sciences has shown that there is a very strong correlation between attendance at lectures and course grade.

Late Submissions

There will be no late submissions or makeups allowed for the CQ's. There will be no late submissions or makeups on the AL assessment in the Problem Sections/Discussion Forums. Extensions for homework will only be granted in exceptional circumstances with appropriate documentation. Contact Dr Changsong Li to request an extension on a digital homework assignment. Contact your TA to request an extension on paper homework.

Make ups for exams that you cannot attend or miss

If you know ahead of time that you cannot take an exam in the designated time window (for example because you are in a very different time zone or because of family responsibilities), you must contact your instructor by email at least 4 days in advance of the scheduled exam requesting to take the exam at an alternate time. If an emergency arises that prevents you from taking the exam at the scheduled time you must contact your instructor by email **no later than 48 hours after** the exam time. Be prepared to provide appropriate evidence in support of your request. Reasonable requests for make up exams will be approved.

Regrades

Requests for regrades on homework or the midterm exams must be made no later than 7 days after the work has been returned to the class. There will be no regrades allowed for the final exam. Once posted, the only reason a course grade will be changed is because of a clerical error. Requests for any of the items listed above must be made to the course coordinator by email, accompanied by appropriate documentation.

Academic Integrity

We will be vigorous in reporting all instances of cheating to the University administration. (See http://www.utdallas.edu/deanofstudents/dishonesty/) In particular, you may **not** use solutions manuals, solutions you find online, or solutions copied verbatim from other students for the digital or paper homework. The graders are trained to detect such instances of cheating and will report them to the course coordinator. Students who attempt to gain an unfair advantage by failing to follow the exam rules will be reported to the University administration. *In particular, you are not permitted to have any another person or any (web-based) test taking service do any part of the exam for you and you are not permitted to provide assistance to another student in the course.* Your instructor reserves the right to recommend to the University administration penalties varying from receiving zero points for a particular assessment item to failing the course.

Seven Salient Study Skills

1. Study $\geq$ 10 hours per week per course.
2. Start studying 10 days before each exam.

3. Do past exams to master and apply concepts from lectures.
4. Study 70% solo and 30% in a group of 3.
5. Talk more than listen.
6. Write more than read.
7. Understand more than memorize.
8. Ask questions!

Also see Chew Videos on How to Study

Advice for Exams

A large collection of **past exams** are on the course web page together with some solutions. *Do them!* Exams will include problems similar to those in the homework and the quizzes. In particular, some questions will explicitly test theoretical concepts covered in class. Although the exams are open book, they are timed. Therefore we strongly encourage you to first master the theory and memorize calculation methods and formulae you need to quickly access. Then use this knowledge to work a range of problems *without looking at your notes*. To learn theory, calculation methods, and formulae with your lecture notes and book closed write down what you know about each item in the Math 2415 Learning Outcomes on the course webpage, as precisely and succinctly as you can. Only when you get stuck should you look at your lecture notes. If you do this about 4 times in the 10 days prior to the exam you should be in good shape. Don't forget to work lots of (past exam) problems as well! You should also spend *some but not all* of your preparation time studying in small groups to learn from each other. Presenting material to someone else is often the best way to work out whether you really know it yourself.

UT Dallas Syllabus Policies and Procedures

The information at `http://go.utdallas.edu/syllabus-policies` constitutes the University's policy and procedures segment of the course syllabus.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.