Course Head: Charles Daly **Math 0180 Fall 2024**

Instructors: Charles Daly, Eric Jovinelly, Haram Ko

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Textbook: Thomas' Calculus: Early Transcendentals 15th edition

Course Description: This course is meant to provide an overview of basic three-dimensional calculus. The semester will begin with vector algebra, multivariable-functions, and some linear algebra concepts. We will then focus on applying methods and ideas from single-variable calculus to multivariable functions. In particular, we'll learn about limits in multivariable functions, partial derivatives, the chain rule, and Lagrange multipliers. Afterwards we'll focus our attention on multivariable integral calculus by learning how to parametrize curves and surfaces in space and how to integrate functions over them. We'll use our understanding of derivatives and integration to address Green's Theorem, Stoke's Theorem, and the Divergence Theorem.

Registration: All seats in this section are first come first served and we do not have a waitlist. Overrides will not be given out until at least Sept 16th, and frequently none are given out at all. If the course is currently full and you are unable to register, please check CAB regularly throughout shopping period to see if seats have been added or vacated so that you may enroll.

Canvas: Our Canvas site will be where we post important information such as course announcements, homework solutions, lecture recordings, grades, and other content relevant to the course. You are responsible for regularly checking this page. A hyperlink to the course page can be found above. It should be noted for ease of access we have combined all the sections of the course into a single Canvas page and thus all interactions posted there are visible to other sections. If you have concerns about this sort of access, please contact us.

Grading: Your grade will be determined by homework, quizzes, and three exams: two midterms and final. Homework and quizzes are worth 15% and 10% of your total grade respectively. Exam 1, exam 2, and the final are worth 20%, 25%, and 30% of your total grade respectively. I will honor the following grade thresholds: any total grade that is at least 90% is guaranteed an A or S with distinction. Any total grade that is at least 80% is guaranteed a B. Any total grade that is at least 70% is guaranteed a C or S. It is possible these thresholds will be moved down, but they will *not* be moved up.

Your two lowest homework grades and your two lowest quiz grades are dropped in the calculation of your final averages. This policy exists *specifically* to address unpreventable absences, emergencies, etc. That said late homework and missed quizzes will not be made up. If you have more than two missing homework or quizzes that are all due to illness, injury, emergency, or mental health crises, contact me (Charles Daly).

Homework: There will be about thirteen homework assignments that will be assigned every week and will consist of twelve or so problems assigned from the textbook. Specific problems are posted below. You will notice problems come in two varieties, self-check problems, and collected problems. Although self-check problems are not collected, you are strongly encouraged to complete them as both

quizzes and exams are modeled after the homework.

Homework will be submitted through Gradescope and is due **every Thursday at 11:59 PM (EST)**. As technical difficulties happen, you are provided a grace-period of an additional hour to submit your homework, however anything past that will *not* be graded and you will receive no credit for that particular assignment. You can access Gradescope by clicking the Gradescope tab on our Canvas homepage, typically located on the left of the screen. When submitting an assignment through Gradescope, be sure to assign each problem to one or more pages. If you do not assign pages to a particular problem, your work may not be graded. Homework will be graded *anonymously* so please do *not* include your name on your submission. Your homework should be written, or typed, sufficiently legibly so that the grader may read it, otherwise you may receive no credit for that particular problem.

You are allowed to form study groups and discuss the homework together, in fact I encourage this, but only after you attempt the homework yourself. You should engage with the problems on your own before discussing them with others.

Exams: Exam 1 will take place **Monday October 7th at 6:30 PM**. Exam 2 will take place **Thursday November 14th at 6:30 PM**. The final will take place on **December 20th, 2024 at 2:00 PM**. Exam 1 and 2 will be 1.5 hours long and consist of 5 problems each. The final will be 3 hours long and consist of 10 problems. The content of the exams will be largely modeled after the homework. Exams will be closed book and the use of electronic devices is strictly prohibited.

Recitations and Quizzes: Recitations are held once every week. They are meant to provide you another learning environment to bolster your understanding of the material covered from recent lectures. Here you'll work in small groups to complete an (ungraded) worksheet and towards the end of each recitation there will be a quiz. Each quiz is ten minutes long and typically a single problem or two. As the quizzes are graded it is important that you attend your registered recitation.

Office Hours: Office hours are held weekly and the full schedule can be found below. We observe an open-door policy about office hours, meaning you may attend any office hour listed below regardless of your section and instructor.

Accommodations: If you have an exam accommodation approved by the Student Accessibility Accommodations, you must let me (Charles Daly) know *at least two weeks before the exam.* Please contact me directly through email or Canvas. Providing me two weeks notice guarantees that we will be able to honor your full accommodations, i.e. a quiet testing environment, additional time, etc. However, if this two weeks notice is not fulfilled, I *cannot* guarantee the full accommodations will be met.

Academic Integrity: The instructors of this course take Brown's Academic Code, and academic integrity in general, very seriously. Submitting dishonest work, whether on homework or exams, makes it more difficult to effectively help you and your fellow students learn, and it dilutes the meaning of a Brown degree.

It is your responsibility to understand what actions are allowed in this course, and what actions are violations of the Academic Code. Further information is available here. Any incidents that appear to violate course rules will be presented to, and adjudicated by, the university's Academic Code committee.

Use of Artificial Intelligence: The use of artificial intelligence is not strictly prohibited in this class, but it is strongly discouraged. As no electronic devices will be allowed on the exams, relying heavily on the use of supplementary resources seems disadvantageous for exam performance.

Inclusivity and Equity: This course strives to be accessible and inclusive to all students, regard-

less of age, race, nationality, gender identity, sexual orientation, religion, economic background, or any other difference that contributes to the vibrant and diverse Brown community. We are committed to conducting all interactions with students with a sense of respect and equity. We ask that students interact with other students and instructors in this same spirit. If something happens to make you feel unwelcome or discriminated against, please bring it to our attention so that we can try to make the situation right.

In addition, Brown is committed to providing support for students with learning differences, physical impairments, and other disabilities. If you think you may need accommodations due to one of these conditions, contact Student Accessibility Services for more information.

Schedule:

Week 1: Sep 4 - Sep 6   Vectors and Vector Algebra: (12.1, 12.2, 12.3)

Week 2: Sep 9 - Sep 13   Cross Products: Lines, Planes, and Curves: (12.4, 12.5, 13.1)

Week 3: Sep 16 - Sep 20   Vector-valued functions: (13.2, 13.3, 14.1)

Week 4: Sep 23 - Sep 27   Continuity, partial derivatives, chain rule: (14.2, 14.3, 14.4)

Week 5: Sep 30 - Oct 4   Directional derivatives, tangent planes: (14.5, 14.6)

Week 6: Oct 7 - Oct 11   Lagrange Multipliers: (14.7, 14.8) (*Exam 1 Mon Oct 7th*)

Week 7: Oct 14 - Oct 18   Double Integrals: (15.1, 15.2, 15.3) (No class on Oct 14th)

Week 8: Oct 21 - Oct 25   Polar Coordinates, Triple Integrals: (15.4, 15.5)

Week 9: Oct 28 - Nov 1   Additional Coordinate Systems: (15.6, 15.7)

Week 10: Nov 4 - Nov 8   Change of Variables, Line Integrals: (15.8, 16.1)

Week 11: Nov 11 - Nov 15   Vector Fields: (16.2, 16.3) (*Exam 2 Thu Nov 14th*)

Week 12: Nov 18 - Nov 22   Green's Theorem and Surfaces: (16.4, 16.5)

Week 13: Nov 25 - Nov 29   Surface Integrals, Stoke's Theorem: (16.6, 16.7)

Thanksgiving break from Nov 27th 12:00 PM (EST) to Dec 1st

Week 14: Dec 2 - Dec 6   Stoke's Theorem, Divergence Theorem: (16.7, 16.8)

Final Exam - Dec 20th 2:00 PM (EST)

Homework: Remember to assign pages to problems when uploading to Gradescope!

Week 1: Sep 4 - Sep 6

Self-Check: 12.1: 7, 11, 21, 23, 25, 33, 41
12.2: 7, 11, 23, 31, 35
12.3: 3, 13, 15, 19, 33
Collected: 12.1: 10, 20, 36, 56
12.2: 8, 12, 24, 32
12.3: 2, 16, 20, 34, 46

Week 2: Sep 9 - Sep 13

Self-Check: 12.4: 9, 17, 21, 27, 31, 41
12.5: 5, 25, 41, 65
13.1: 5, 9, 21, 35, 37
Collected: 12.4: 22, 24, 28, 32, 46
12.5: 8, 28, 50, 74
13.1: 6, 10, 26, 38

Week 3: Sep 16 - Sep 20

Self-Check: 13.2: 9, 13, 19, 23
13.3: 1, 3, 5, 9, 19
14.1: 9, 15, 23, 35, 43, 51
Collected: 13.2: 6, 18, 24, 32
13.3: 4, 10, 12, 18
14.1: 10, 14, 32, 42, 50

Week 4: Sep 23 - Sep 27

Self-Check: 14.2: 9, 19, 23, 43, 51
14.3: 11, 17, 21, 27, 37, 85, 95
14.4: 5, 11, 37, 47, 51
Collected: 14.2: 8, 20, 44, 52
14.3: 18, 50, 78, 92
14.4: 6, 10, 38, 48

Week 5: Sep 30 - Oct 4

Self-Check: 14.5: 3, 9, 15, 25, 31, 35, 43
14.6: 3, 11, 17, 29, 31, 45, 55
Collected: 14.5: 8, 16, 20, 30(abc), 32, 36
14.6: 4, 12, 20, 26, 30

Week 6: Oct 7 - Oct 11

Self-Check: 14.7:5, 15, 29, 35, 39, 31, 55, 61
14.8: 7, 13, 25, 27, 29, 47
Collected: 14.7: 6, 20, 36, 42, 48, 50, 58
14.8: 10, 20, 24, 28, 36

Week 7: Oct 14 - Oct 18

Self-Check: 15.1: 7, 13, 15, 31
15.2: 9, 15, 21, 49, 53, 59, 69, 75
15.3: 9, 19, 23
Collected: 15.1: 16, 20, 32
15.2: 22, 24, 50, 52, 60, 64, 70
15.3: 20, 24

Week 8: Oct 21 - Oct 25	Self-Check: 15.4: 5, 11, 17, 19, 25, 35, 43, 45
	15.5: 3, 11, 17, 21(ace), 23, 29, 31, 47
	Collected: 15.4: 6, 12, 20, 24, 36, 40
	15.5: 4, 14, 26, 32, 36, 38
Week 9: Oct 28 - Nov 1	Self-Check: 15.6: 5, 15, 25, 29, 31
	15.7: 33, 37, 51, 59, 61, 69, 71, 75, 87, 93
	Collected: 15.6: 6, 14, 30, 32
	15.7: 34(ab), 36, 38, 56, 68, 80, 88, 102
Week 10: Nov 4 - Nov 8	Self-Check: 15.8: 1, 3, 5, 9, 13, 15, 19
	16.1: 9, 13, 15, 19, 21, 23, 27, 35
	Collected: 15.8: 2, 6, 8, 10, 12, 20
	16.1: 10, 12, 22, 24, 30, 36
Week 11: Nov 11 - Nov 15	Self-Check: 16.2: 11, 15, 25, 27, 35, 41, 53, 59, 61
	16.3: 7, 21, 25, 29, 31, 33
	Collected: 16.2: 8, 14, 24, 30, 40, 58, 62
	16.3: 8, 22, 24, 30, 38
Week 12: Nov 18 - Nov 22	Self-Check: 16.4: 9, 13, 15, 21, 23, 29, 37, 41
	16.5: 3, 5, 19, 27, 37, 43, 47
	Collected: 16.4: 8, 12, 18, 26, 30, 44
	16.5: 8, 12, 20, 38, 44, 52
Week 13: Nov 25 - Nov 29	Self-Check: 16.6: 1, 5, 13, 17, 25, 37, 41, 49
	16.7: 3, 7, 9, 11, 13, 15, 21, 23
	Collected: 16.6: 2, 8, 12, 22, 24, 38, 48
	16.7: 8, 10, 14, 20, 26, 28
Week 14: Dec 2 - Dec 6	Self-Check: 16.7: 17, 27, 31
	16.8: 1, 3, 11, 13, 15, 19, 21, 23, 27, 29, 33
	(not) Collected: 16.7: 30
	16.8: 2, 4, 10, 16, 18, 24, 28, 30

Lectures

Section	Days	Time	Location	Instructor
S01	MWF	11:00 AM - 11:50 AM	Bio Med Center 291	Charles Daly
S02	MWF	12:00 PM - 12:50 PM	Smith-Buonanno Hall G13	Haram Ko
S03	TTh	9:00 AM - 10:20 AM	Barus and Holley 165	Eric Jovinelly

Office Hour Schedule

Monday

Charles 12:00 PM - 1:00 PM   Kassar 309 (for now)

Haram 1:00 PM - 2:00 PM   TBD

Tuesday

Wenrui 1:30 PM - 2:30 PM   TBD

Wednesday

Charles 12:00 PM - 1:00 PM   Kassar 309 (for now)

Thursday

Haram 4:30 PM - 5:30 PM   TBD

Friday

Wenrui 1:30 PM - 2:30 PM   TBD