

California State University, Sacramento

2021 Summer Program

MATH 300 Multivariable Calculus

Course Outline

Course Code: MATH 300

Instructor: Kun Zhao

Office Hours: by appointment

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Credit: 3

Course Description: Calculus of vector functions, analytic geometry of space, partial differentiation, multivariable optimization, multiple integrals, Green's Theorem, Stokes' Theorem, Divergence Theorem

Textbook: *Calculus: Early Transcendental*, 8th edition, by James Stewart

Prerequisite: Calculus I and II: You should have already completed two semesters of single variable calculus that cover derivatives and integrals.

Course Outline: The course covers materials in Chapters 12-16 of the text. The following is a tentative schedule, which may be subject to change, which will be announced in class.

 **Week 1.**

- Chapter 12: Three-dimensional coordinate system, vectors, dot product, cross product, equations of lines and planes
- Chapter 13: Vector functions and space curves, derivatives and integrals of vector functions, arc length and curvature

 **Week 2.**

- Chapter 14: Functions of several variables, limits and continuity, partial derivatives, chain rule, extreme values, Lagrange multipliers. **Midterm Exam**

 **Week 3.**

- Chapter 15: Double integrals, iterated integrals, double integrals in polar coordinates, triple integrals, triple integrals in cylindrical and spherical coordinates, Change of variables in multiple integrals, line integrals

 **Week 4.**

- Chapter 16: Green's Theorem, curl and divergence, parametric surfaces, surface integrals, Stokes' Theorem, Divergence Theorem. **Final Exam**

Exams: There will be two quizzes, one midterm exam and one comprehensive final exam. The schedule is the following:

1. Quiz 1 – **July 3, 2020** (Friday, Closed book)
2. Midterm – **July 10, 2020** (Friday, Closed book)
3. Quiz 2 – **July 17, 2020** (Friday, Closed book)
4. Final exam – **July 24, 2020** (Friday, Closed book)

The quizzes will have duration of 60 minutes, the midterm and final exams will have duration of 120 minutes. All the tests will take place during the discussion period and in the regular classroom. If a student must miss an exam because of a university-approved conflict, please contact me as soon as possible, and no later than one week before the exam. Apart from these conflicts missing an exam or arriving late for an exam may result in the immediate failure (zero) of that exam.

Homework: Homework problems are assigned at the end of this syllabus. Homework will not be collected, due to the intensive labor required for grading homework. However, you are strongly encouraged to solve all the homework problems to better prepare for the tests.

Grading Policy: For a solution to a problem in a test or in the homework to be considered perfect it is not only required the answer to be correct, but also that a correct outline of the reasoning or a correct calculation leading to it be given as well. In many cases a correct answer alone will not account for partial credit.

Grading Procedures: The course grade will be based on two quizzes (20% each), one midterm exam (25%), and a final exam (35%). The following table

Grade Grade Points

A	4.0
A-	3.7
B+	3.3
B	3.0

B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
D-	0.7
F	0.0

will be used for grades. It provides the minimum percentages for the grades. Eventually, if necessary, an average grading (curving) will be used for the grades.

Office Hours: I am here to help. Please see me before or after class. If I can't help you then, we can set up another time to meet.

Academic Integrity: When completing an assignment for this course, students are expected to do original work for the assignment and to not reuse work they may have done in previous courses or other settings unless specific prior approval. Cheating is defined as the giving or receiving of aid (written, oral, or otherwise) in order for a student to receive undeserved credit on class work, homework, tests or any other assignment that is his or her own responsibility. Plagiarism violates the central core of education philosophy. It involves stealing another person's work and claiming it as one's own. It occurs whenever one directly copies another person's intellectual effort and integrates it into his/her class work without giving proper credit to the author. Paraphrasing is defined as "a restatement of a text or passage giving the meaning in another form" (Webster's New Universal Unabridged Dictionary, 1996). When one paraphrases but intentionally omits authorship of the work, this, too is a serious violation of academic honesty. All students have an individual responsibility to understand what cheating, plagiarism, and paraphrasing are. The student must also be aware that the consequences for doing the above listed offences are severe. Whenever you have doubt about what constitutes cheating, plagiarism, or paraphrasing, contact me.

Homework Assignment:

- 12.1: 7, 9, 13, 15, 21
- 12.2: 1, 3, 13, 15, 21, 25
- 12.3: 9, 11, 23, 27, 31, 45, 47, 53
- 12.4: 7, 13, 16, 19, 31

- 12.5: 5, 7, 13, 19, 31
- 13.1: 13, 17, 23, 27, 41
- 13.2: 15, 19, 25, 37, 39
- 13.3: 3, 5, 17, 19, 31
- 14.1: 7, 15, 19, 25
- 14.2: 7, 9, 13, 21, 29, 33
- 14.3: 21, 33, 52, 55, 67
- 14.5: 5, 7, 10, 11, 21, 23, 27, 31
- 14.7: 9, 13, 19, 31, 33, 41, 43, 51
- 14.8: 3, 7, 9, 11, 21
- 15.2: 3, 9, 17, 19, 27
- 15.3: 5, 8, 10, 14, 15, 17, 21, 25, 29, 49, 53
- 15.4: 7, 9, 11, 13, 15, 21, 25, 39
- 15.7: 3, 6, 7, 9, 11, 13, 17, 19,
- 15.8: 9, 17, 19, 21, 23, 25, 29
- 15.9: 9, 10, 21, 23, 25, 27, 30, 35
- 15.10: 5, 7, 9, 15, 17, 23, 25
- 16.1: 23, 25
- 16.2: 3, 7, 11, 14, 15, 19, 21
- 16.3: 3, 7, 13, 15, 17
- 16.4: 3, 7, 9, 13
- 16.5: 12, 13, 19, 21, 31
- 16.6: 3, 5, 19, 21, 23, 33, 39, 45, 49
- 16.7: 5, 7, 9, 11, 13, 17, 21, 22, 23, 27
- 16.8: 3, 5, 7, 9, 10
- 16.9: 5, 7, 9, 11, 13