Syllabus

Math 226 Fa24

Calculus III

The content of this syllabus is subject to change.

Section	Time	Location
39556	MWF 9-9:50am	KDC 235

Instructor Table

Instructor	Email	Office Hours Location
Prof Geske	geske@usc.edu	KAP 244A
Jishnu Bose	jishnubo@usc.edu	Math Center (KAP 263)

Course Materials

The textbook is recommended but not required.

Textbook	Author	Edition
Essential Calculus	Stewart	2nd

Course Structure

This course is broken up into Unit A, Unit B, and Unit C. Each unit consists of 5 topics. For a total of 15 topics. There is also a topic that is exclusive to the final.

Topic	Name	Description
A1	Vectors and vector operations.	Can able to add and subtract and scalar multiply vectors geometrically and algebraically. Can compute dot products and relate to angles. Can compute cross products an relate to angles and parallelograms. Can compute triple scalar products and relate to parallellepipeds.

A2	Lines, planes, and distance.	Can find parametrizations for lines and planes. Can find scalar equations for planes using normal vectors. Can calculate distances between pairs of objects among lines and planes and points.
A3	Curves and surfaces.	Can parametrize curves and calculate velocity and speed and tangent lines. Can understand the graphs of quadric surfaces whose axes of symmetries are along the coordinate axes and can understand basic transslational and scaling transformations of these surfaces.
A4	Multivariable functions and partial derivatives and tangent planes.	Can understand the graphs of multivariable functions and their contour diagrams. Can compute and geometrically interpret partial derivatives. Can use partial derivatives to find tangent planes and linear approximations.
A5	Gradients and directional derivatives and the chain rule.	Can compute gradients algebraically and can estimate them using contour diagrams. Can use gradients to find tangent/normal planes /lines to level sets. Can calculate directional derivatives and can interpret them as rates of change. Can determine the direction of greatest/least/zero increase. Can use the multivariable chain rule to calculate derivatives.
B1	Multivariable optimization.	Can locate critical points and absolute/global extremums of functions on specified domains. Can use the second derivative test to classify points as local minimizers or local maximizers or saddle points.
B2	Lagrange multipliers.	Can use Lagrange multipliers to optimize functions subject to equality constraints. Can use Lagrange multipliers to solve word problems.
B3	Double integrals.	Can compute double integrals over rectangular regions or regions between graphs. Can interpret double integrals geometrically. Can understand the meaning of integrating a density function. Can change the order of integration and can sketch regions of integration.
B4	Triple Integrals.	Can compute triple integrals over rectangular boxes or regions between graphs. Can understand the meaning of integrating a density function. Can change the order of integration.
B5	Polar and cylindrical coordinates.	Can graph or interpret graphs of basic regions using polar/cylindrical coordiantes. Can convert between rectangular and polar/cylindrical coordinates. Can compute integrals in polar/cylindrical coordinates.
C1	Spherical coordinates.	Can graph or interpret graphs of basic regions using polar/cylindrical coordiantes. Can convert between rectangular/cylindrical and spherical coordinates. Can compute integrals in polar/cylindrical coordinates.
C2	Vector Fields and line Integrals.	Can compute scalar line integrals an interpret them in terms of fence areas. Can compute arclength of curves. Can interpret vector fields. Can compute vector line integrals and interpret them in terms of flow or work. Can estimate sign of vector line integrals given sketches of vector fields.
		Can decide whether a vector field is conservative and can calculate a

C3	Conservative vector fields and curl.	potential if so. Can use a potential to evaulate conservative vector line integrals. Can use path independence of conservative vector line integrals. Can identify a closed curve and can use that a conservative vector line integral over a closed curve is zero. Can calculate curl and interpret using sketches of 2D vector fields. Can use that the curl of a conservative vector field is 0.
C4	Surface integrals.	Can parametrize surfaces. Can use parametrizations to calculate tangent planes to surfaces. Can calculate surface area of surfaces. Can calculate scalar surface integrals. Can calculate vector surface integrals and interpret them into terms of flow.
C5	Green's Theorem and Stoke's Theorem.	Can use Green's theorem to compute vector line integrals over closed curves. Can use Stokes's Theorem to compute curl vector surface integrals. Can use Stokes's Theorem to compute line integrals over boundaries of surfaces.
Final Only	Divergence Theorem.	Can identify closed surfaces. Can use the divergence theorem to compute vector surface integrals over closed surfaces.

See the Daily Schedule for a day-by-day breakdown of our progression through the units.

Grading is broken up into Homework, Topic Mastery, and the Final Exam.

Category	**Weight Total**	**Quantity of Items in Category**	**Weight Per Item**
Homework	10%	[12 HWs - lowest 2 dropped] = [10 counted HWs]	1% per HW
Topic Mastery	55%	15 topics	3.67% per topic
Final Exam	35%	1 exam	35%

Homework

Homework will be due every Saturday at 11:59pm except for the first Saturday and on holiday Saturdays.

Homework Guidelines. Although we encourage you to discuss the homework with your peers, you must write your own solutions to the problems. If in doubt, you should be able to explain the details of your thought process if requested.

You must show your work. You will not receive credit for final answers without work.

Write legibly. You may not receive credit for work that is illegible or unintelligible.

Ensure your submissions are properly oriented (e.g. not sideways). Use the Gradescope feature that attaches problems to pages in your submission as shown in this link.

Homework Grading. 5 problems will be randomly selected from each assignment and be

graded for correctness out of 2 points each. Therefore each homework will be worth 10 points.

Homework Extensions. You will be allowed 3 24-hour extensions on assignments. To receive a 24-hour extension, you must email a request to your instructor. No other extensions will be granted. Beyond this allowance late homework will not be accepted.

Contribution to Final Grade. Homework counts for 10% of your final grade. Your lowest 2 homework grades will be dropped. Therefore each non-dropped homework contributes 1% to your final grade.

Topic Mastery

There are 15 topics (A1-A5, B1-B5, C1-C5) which were listed earlier in the syllabus.

Individual Topic Grading. Each topic is graded out of 4 points. 4 points indicates mastery. Topic grading will be assessed using Midterms and Retakes.

Date	Assessment	Time	Location
Mon Sep 30	Midterm A	Your Lecture Time	Your Lecture Classroom
Tue Oct 15	Retake ≤A	Your Discussion Time	Your Discussion Classroom
Mon Oct 28	Midterm B	Your Lecture Time	Your Lecture Classroom
Tue Nov 12	Retake ≤B	Your Discussion Time	Your Discussion Classroom
Mon Nov 25	Midterm C	Your Lecture Time	Your Lecture Classroom
Thu Dec 5	Retake ≤C	Your Discussion Time	Your Discussion Classroom

Each Midterm is tied to a unit and will have a single problem (with parts) for each each topic in that unit. For example Midterm A is tied to Unit A and will have A1, A2, A3, A4, and A5 problems. Each problem will be graded out of 4 points, indicating your score on that topic.

Each Retake is tied to all units up to that point and will have a single problem (with parts) for each topic in that unit. For example Retake ≤B is tied to Unit A and Unit B and will have A1, A2, ..., A5, B1, B2, ..., B5 problems. Each problem will be graded out of 4 points, indicating your score on that topic.

Your final score on a topic will be the maximum of your scores on each assessment. For example if your scores on A3 were [A3 on Midterm A: 1 points] and [A3 on Retake ≤A: 2 points] and [A3 on Retake ≤B: 3 points] and [A3 on Retake ≤C: 2 points] then your final score on A3 would be 3 points, as this was the maximum of your scores. Note that this means, if you ever score 4 points on a topic in an assessment, then you are effectively done with that topic, at least until the final exam.

Midterm and Retake Guidelines. Calculators are **not** allowed on any Midterms or Retakes. You will be allowed a both sides of single handwritten 3 in by 5 in notecard on Midterms and Retakes.

Contribution to Final Grade. Topic Mastery counts for 55% of your final grade. Therefore each topic contributes 3.67% to your final grade.

Final Exam

There is a shared cumulative final exam for all students taking Math 226 at the university.

Date	Time	Location
Dec 11	2-4pm	TBA

It is university policy that no student may take this exam early or be allowed to skip it.

Final Exam Guidelines. Calculators are **not** allowed on any Midterms or Retakes. You will be allowed both sides of single handwritten standard sheet of paper on the Final Exam.

Class Recording

Lectures will be recorded regularly and those lectures posted on Brightspace.

Discussion Section

Attending and participating in discussion section is essential for success in the course.

In discussion section you will have the opportunity to work through additional problems related to the topics with the help of the TAs. This will also be an opportunity for you to received help on the homework from your TA. You will also take your retakes in discussion section.

Office Hours

These are an essential resource that often go underutilized. We encourage you to attend them to receive help on any aspect of the course.

Math Center

The USC Math Center (KAP 263) is a place to go if you want help with your math classes. Please visit the Math Center website for more information

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbookor theOffice of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Course Content Distribution and Recording Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Students and Disability Accommodations

USC welcomes students with disabilities into all of the University's educational programs.The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and

followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems

Counseling and Mental Health - (213) 740-9355 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355 (WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues