Syllabus

19 02 POINT LOMA NAZARENE UNIVERSITY	**Department of Mathematical, Computer, and Information Sciences** **MTH 2074 Calculus III** **4 Units** (MWF, 8:30-9:35, RS 295)
Fall 2024 September 2nd - December 20th	

Section:	**Instructor:**	**Final Exam**	**Phone:**	**Office Hours:**	**Email:**
MWF, 8:30-9:35, RS 295	Professor Greg Crow, Ph.D.	Friday 20-Dec-2024 from 7:30-10:00 AM	619.849.2604	Rohr Science 252 Posted in Canvas	gcrow@pointloma.edu

PLNU Mission

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission

The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

WELCOME MESSAGE

I look forward to spending the semester exploring Multivariate Calculus with you. You will be amazed at how easy some concepts are to understand, and equally amazed at how challenging some problems are to solve. Please know that your fellow classmates and I will be here to help you through it.

COURSE DESCRIPTION

Conceptual development of the calculus of functions of more than one variable supported by the use of a symbolic computer algebra system. Limits and continuity, partial derivatives, chain rule, extreme values, Taylor's theorem, multiple integrals, line and surface integrals, Green's Theorem and Stokes' Theorem.

Prerequisite: Mathematics 1074 (or equivalent) with a grade of C- or higher

COURSE LEARNING OUTCOMES -

1. Students will be able to demonstrate facility with analytical concepts.
2. Students will be able to demonstrate facility with algebraic structures.
3. Students will be able to apply their mathematical knowledge to solve problems.
4. Students will be able to use technology to solve problems.
5. Students will be able to speak about their work with precision, clarity and organization.
6. Students will be able to write about their work with precision, clarity and organization.
7. Students will collaborate effectively in teams.
8. Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.

9. Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

1. Textbook: *Calculus,* 9th ed. or M*ultivariable Calculus,* 9th ed. by James Stewart, Daniel K. Clegg, and Saleem Watson
2. A cheap ($10-$25) scientific calculator other than your phone, tablet, pad, or computer (with at least x^y, Ln, and Cos)
3. A box of 20 vectors (earth tones if possible)

Comment

We will try and avoid the following pitfall:

> At the beginning college level, visualization is a big part of understanding. Consequently, students who are operating with few mental pictures are not really learning mathematics. Their calculus consists of a vast series of algorithms and a complicated cataloging system which tells them which procedure is used when. The effort put into this kind of teaching and learning is largely wasted: memorized algorithms are soon forgotten and, worse still, such courses perpetuate the idea that math involves doing calculations rather than thinking.
>
> (by Deborah Hughes Hallet in Visualization and Calculus Reform, in the collection Visualization in Teaching and Learning Mathematics, edited by Zimmerman and Cunningham (MAA notes \#19))

COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4-unit class delivered over fifteen weeks. It is anticipated that students will spend a minimum of 37.5 participations hours per credit hour on their coursework. Specific details about how the class meets the credit hour requirement can be provided upon request.

Course Format

Mathematics is learned by doing. You are encouraged to work with each other; however, you are responsible for the material and simply copying answers will be to your detriment.

ASSESSMENT AND GRADING

Grade Components

- **Homework:** The homework is designed to allow you to grasp the concepts of Multivariable Calculus; it is not an end in itself. Assignments will be announced on Monday, Wednesday and Friday. The work will be due on the following Friday. The problems from the text may be submitted entirely on paper in written or in Word®, Scientific Word® (LaTex), or Excel® format or any coherent combination of these.
- **Late work will not be accepted** without prior consent or a well-documented emergency. Up to a maximum of one homework assignment will be accepted up to 3 days late provided that consent is received from the professor before it is due. Homework assignments that are submitted late, without prior consent, will be recorded with a score of zero. If more than half of the homework assignments are submitted on time, then the lowest homework score will be dropped from the calculations of the homework grade.
- **Groups:** There is almost a century of research showing that academic achievement, productivity, and self-esteem improve dramatically when students work together in groups. This method emphasizes teamwork, cooperation and support by others, rather than isolation and competition in learning. You will be randomly assigned to a group on a four to eight week basis. Certain homework problems will be assigned to each group. If selected, your group will present their assigned problems to the class. Absence or obvious lack of participation will lower your semester Classwork and Participation grade by up to 10% per week.
- **Examination Schedule**. The examination schedule is included in the daily schedule. This instructor does not intend to accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents.
- **Examinations and the Final Examination**. Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent or a well-documented emergency beyond your control. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control.

  Final Exam: Scheduled on Friday 20-Dec-2024 from 7:30-10:00 AM. Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the **Class Schedules (http://www.pointloma.edu/experience/academics/class-schedules)** site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

Grading Distribution	Percent
Final Examination	30

Three Examinations at 15% each	45
Written Homework	20
Classwork & Participation	5
Total	**100**

Grading Scale

Grades are based on the number of points accumulated throughout the course with the following exception. A student must pass at least one of Examination 1, Examination 2, Examination 3, or the Final Examination in order to pass the class. That is, a score of 60% must be achieved on one of the Examinations, or else the final grade will be an F regardless of all other point totals. Approximate minimal percentages required to obtain a given grade are

Standard Grade Scale Based on Percentages					
	A	**B**	**C**	**D**	**F**
+		[87.5-90.0)	[77.5-80.0)	[67.5-70.0)	
	[92.5-100]	[82.5-87.5)	[72.5-77.5)	[62.5-67.5)	[0.0-60.0)
–	[90.0-92.5)	[80.0-82.5)	[70.0-72.5)	[60.0-62.5)	

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. We understand that life happens, if you contact your instructor prior to the due date of the assignment you may request one extension as indicated above. Incompletes will only be assigned in extremely unusual circumstances.

CLASS ENROLLMENT

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

ARTIFICIAL INTELLIGENCE (AI) POLICY

You are allowed to use Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (**EAC@pointloma.edu (https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=EAC@pointloma.edu)** or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. The EAC makes accommodations available to professors at the student's request.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any special accommodations.

SEXUAL MISCONDUCT AND DISCRIMINATION POLICY

In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at **pointloma.edu/Title-IX (http://pointloma.edu/Title-IX)** . Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at **counselingservices@pointloma.edu (https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=counselingservices@pointloma.edu)** or find a list of campus pastors at **pointloma.edu/title-ix (http://pointloma.edu/title-ix)** .

If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources at **www.pointloma.edu/bias (http://www.pointloma.edu/bias)** .

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will
issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university withdrawal date or, after that date, receive an “F” grade.

PLNU RECORDING NOTIFICATION:

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel.

Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

CLASS ENROLLMENT:

It is the student’s responsibility to maintain their class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student’s responsibility to notify the institution of any change in his or her physical location. Refer to the map on **State Authorization (https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures)** to view which states allow online (distance education) outside of California.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact your professor or the **Office of Student Life and Formation (https://www.pointloma.edu/offices/spiritual-development)** .

Fall 2024 — Weekly Academic Calendar

	Sun	Monday	Tues	Wednesday	Thurs	Friday	Sat
September	1	2 **Labor Day**	3	4 Introduction: Syllabus and Calendar 12.1 Three-Dimensional Coordinate Systems	5	6 12.2 Vectors 12.3 The Dot Product	7
	8	9 12.4 The Cross Product 12.5 Equations of Lines and Planes	10	11 12.6 Cylinders and Quadric Surfaces	12	13 13.1 Vector Functions and Space Curves	14
	15	16 13.2 Derivatives & Integrals of Vector Functions	17	18 13.3 Arc Length and Curvature	19	20 13.4 Motion in Space: Velocity and Acceleration	21
	22	23 14.1 Functions of Several Variables	24	25 **Review for Exam I**	26	27 **Exam I**	28
	29	30 14.2 Limits and Continuity	1	2 14.3 Partial Derivatives	3	4 14.4 Tangent Planes and Linear Approximations	5
October	6	7 14.5 The Chain Rule	8	9 14.6 Directional Derivatives and the Gradient Vector	10	11 14.7 Maximum and Minimum Values	12
	13	14 14.8 Lagrange Multipliers	15	16 15.1 Double Integrals over Rectangles	17	18 15.2 Double Integrals over General Regions	19
	20	21 **Review for Exam II**	22	23 **Exam II**	24	25 Fall Break	26
	27	28 15.3 Double Integrals in Polar Coordinates **Spiritual**	29	30 15.4 Applications of Double Integrals **Renewal**	31	1 15.5 Surface Area **Week**	2
November	3	4 15.6 Triple Integrals	5	6 15.7 Triple Integrals in Cylindrical Coordinates	7	8 15.8 Triple Integrals in Spherical Coordinates Last Sem. Withdrawals	9
	10	11 15.9 Change of Variables in Multiple Integrals	12	13 16.1 Vector Fields	14	15 16.2 Line Integrals	16
	17	18 16.3 The Fundamental Theorem: Line Integrals	19	20 **Review for Exam III**	21	22 **Exam III**	23
	24	25 16.4 Green's Theorem	26	27 Thanksgiving Recess	28	29	30
December	1	2 16.5 Curl and Divergence	3	4 16.6 Parametric Surfaces and Their Areas	5	6 16.7 Surface Integrals	7
	8	9 16.8 Stokes' Theorem	10	11 16.9 The Divergence Theorem	12	13 **Review for Final Exam**	14
	15	16	17	18	19	20-Dec **Final Exam** **7:30 – 10:00 AM**	21