MTH274 (4 units) Calculus III

MWF 10:55-12:05 LA 102

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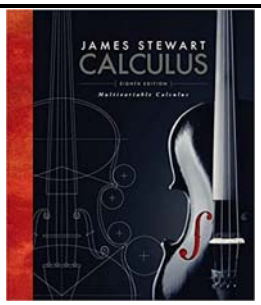
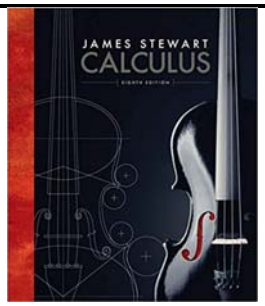
Textbook:	ISBN: 978-1305266643 or ISBN: 978-1285740621





Catalog Description

MTH 274 (4 Units) Calculus III

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.

Class Learning Outcomes

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

- Calculator: A scientific calculator (including Ln and Cos in the $10 to $20 range).
- 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 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.

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 homework grade by up to 10% per week.

- **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.
- **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.

Grading Policies

Grading Distribution	Percent
Three Examinations at 15% each	45
Final Exam	30
Written Homework	25
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 Exam 1, Exam 2, Exam 3, or the Final Exam in order to pass the class. That is, a score of 60% must be achieved on one of the Exams, 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:

Grading Scale in percentages	A	B	C	D
+		(87.5, 90)	(77.5, 80)	(67.5, 70)
	[92.5, 100]	[82.5, 87.5]	[72.5, 77.5]	[62.5, 67.5]
–	[90, 92.5)	[80, 82.5)	[70, 72.5)	[60, 62.5)

Attendance Policy

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day. Here is the university's stated policy on attendance:

> Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See https://catalog.pointloma.edu/content.php?catoid=35&navoid=2136#Class_Attendance in the Undergraduate Academic Catalog.

If you miss 10% of the class, you will receive a warning. If you miss 20% of the class, you will be automatically de-enrolled.

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.

Academic Accommodations:

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

Academic Honesty:
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. Faculty should follow and students may appeal using the procedure in the university Catalog. See https://catalog.pointloma.edu/content.php?catoid=35&navoid=2136#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

Copyright Protected Materials
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.

Credit Hour
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 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Point Loma Nazarene University Mission
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.

Final Exam: 10:30-1:00 PM Monday December 10th, 2018
The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

The Final Exam is a Comprehensive Examination.

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
August	26	On Tuesday 28th (Monday Schedule) Introduction: Syllabus and Calendar 12.1 Three-Dimensional Coordinate Systems 12.2 Vectors	28	29 12.3 The Dot Product 12.4 The Cross Product	30	31 12.4 The Cross Product 12.5 Equations of Lines and Planes	1
September	2	3 **Labor Day** (No Classes)	4	5 12.6 Cylinders and Quadric Surfaces	6	7 13.1 Vector Functions and Space Curves	8
	9	10 13.2 Derivatives and Integrals of Vector Functions	11	12 13.3 Arc Length and Curvature	13	14 13.4 Motion in Space: Velocity and Acceleration	15
	16	17 14.1 Functions of Several Variables	18 Exam Review	19 **Exam 1**	20	21 14.2 Limits and Continuity	22
	23	24 14.3 Partial Derivatives	25 **Spiritual Renewal Week**	26 14.4 Tangent Planes and Linear Approximations	27 **Spiritual Renewal Week**	28 14.5 The Chain Rule	29
	30	1 14.6 Directional Derivatives and the Gradient Vector	2	3 14.7 Maximum and Minimum Values	4	5 14.8 Lagrange Multipliers	6
October	7	8 14.8 Lagrange Multipliers	9	10 15.1 Double Integrals over Rectangles	11	12 15.2 Double Integrals over General Regions	13
	14	15 15.2 Double Integrals over General Regions	16	17 15.3 Double Integrals in Polar Coordinates	18	19 Fall Break	20
	21	22 15.4 Applications of Double Integrals	23 Exam Review	24 **Exam 2**	25	26 15.5 Surface Area	27
	28	29 15.6 Triple Integrals	30	31 15.7 Triple Integrals in Cylindrical Coordinates	1	2 15.8 Triple Integrals in Spherical Coordinates	3

November	4	5 15.9 Change of Variables in Multiple Integrals	6	7 16.1 Vector Fields	8	9 16.2 Line Integrals	10
	11	12 16.3 The Fundamental Theorem: Line Integrals	13	14 16.4 Green's Theorem	15	16 Exam Review	17
	18	19 **Exam 3**	20	21 Thanksgiving Recess	22	23	24
	25	26 16.5 Curl and Divergence	27	28 16.6 Parametric Surfaces and Their Areas	29	30 16.7 Surface Integrals	1
December	2	3 16.8 Stokes' Theorem	4	5 16.9 The Divergence Theorem	6	7 Final Exam Review	8
	9	10 **Final Exam** **10:30 AM**	11	12	13	14	15