

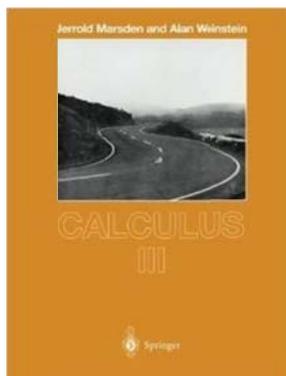


Syllabus for Calculus III MWF 8:30-9:35 – Fall 2014

Rohr Science 220 – (619) 849-2604 – gcrow@pointloma.edu

Instructor:
Greg Crow, Ph.D.
gcrow@pointloma.edu

Office Hours:
Rohr Science 220
619.849.2604 RS220



URL for the text book at UC Berkeley:

<http://escholarship.org/uc/search?keyword=marsden+weinstein+calculus>

URL for the text book at CalTech

<http://www.cds.caltech.edu/~marsden/volume/Calculus/>

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.

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.
- Students will be able to write about their work with precision, clarity and organization.
- 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 is recommended (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 [emphasis added].

(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))

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), Excel[®], or Maxima format or any coherent combination of these.

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.

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 |
| Homework (text exercises) | 25 |
| Total | 100 |

Grading scale

Grades are based on the percentage of points accumulated in each category 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) |

Other factors that affect grades are

- Late work. A written assignment or computer assignment is late if it is not received at the beginning of class on the due date. Late work need not be accepted. Work accepted late may be assessed a penalty. Make-up tests (or the exam) will be given only by arrangement with the instructor for reasons of documented emergency.
- Questions on written assignments and exams: Written assignments and test/exam questions and problems must be formulated carefully in terms of words and symbols used in the course. Credit is determined by the degree to which answers and solutions respond to the specific question or problem stated. Maximize your credit by learning the language and symbols of the course.
- Format for Written Assignments. Assignments collected must be prepared in a style suitable for grading. Please use the format demonstrated at the Harvey Mudd website (<https://www.math.hmc.edu/homework/>) LaTeX typesetting is not required. The following guidelines are used to determine credit
 - the organization must be easy to follow the work must be legible
 - complete solutions must be written for problems (not just answers); solutions must be clearly marked use complete sentences to answer questions

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 in which a student is registered is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements to be met. There are no allowed or excused absences except as approved in writing by the Provost for specific students participating in certain university-sanctioned activities. Excused absences still count toward the 10%-20% limits, but allow students to make up work, quizzes, or tests missed as a result of a university-sanctioned activity. Activities of a unique nature, such as labs or other activities identified clearly on the syllabus, cannot be made up except in rare instances when instructors have given advanced, written approval for doing so. Whenever the number of accumulated absences in a class, for any cause, exceeds ten (10) percent of the total number of class meetings, the faculty member should send an e-mail to the student and the Vice Provost for Academic Administration (VPAA) warning of attendance jeopardy. If more than twenty (20) percent of the total number of class meetings is reported as missed, the faculty member or VPAA may initiate the student's de-enrollment from the course without further advanced notice to the student. If the date of de-enrollment is past the last date to withdraw from a class, the student will be assigned a grade of W or WF consistent with university policy in the Grading section of the catalog. There are no refunds for courses where a de-enrollment was processed.

For more details see the PLNU catalog:

http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Class_Attendance

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.

Classroom Attire

All students are expected to dress in ways that make the classroom a place where all students are comfortable and can work efficiently. Distracting attire is not permitted in the classroom. For example, attire associated with the "rush" activities of fraternities and sororities simply causes too many distractions in the classroom. If you choose to "rush" one of the fraternities or sororities, please make sure the "rush" officials know that "rush" attire will not be allowed in this classroom.

Academic Accommodations

While all students are expected to meet the minimum academic standards for completion of their courses as established by the instructor, students with special needs may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center contacts the student's instructors and provides written recommendations for reasonable and appropriate accommodations to meet the individual needs of the student. This policy assists the university in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with special needs and guarantees all qualified students equal access to the benefits of PLNU programs and activities. For more details see the PLNU catalog:

http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Academic_Accommodations

Students in need of academic accommodations as defined by the laws listed above, must discuss options with the professor within the first two weeks of class, and must complete the documentation process with the DRC within the first four weeks of class.

Academic Honesty

The Point Loma Nazarene University community holds the highest standards of honesty and integrity in all aspects of university life. Any violation of the university's commitment is a serious affront to the very nature of Point Loma's mission and purpose. Violations of academic honesty include cheating, plagiarism, falsification, aiding academic dishonesty, and malicious interference. The details of PLNU's meaning of each of these words can be found in the PLNU catalog at:

http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Academic_Honesty

A student remains responsible for the academic honesty of work submitted in PLNU courses and the consequences of academic dishonesty beyond receipt of the final grade in the class and beyond the awarding of the diploma. Ignorance of these catalog policies will not be considered a valid excuse or defense. Students may not withdraw from a course as a response to a consequence.

A student who is caught cheating on any item of work will receive a zero on that item and may receive an "F"

for the semester. See the PLNU Catalog for a further explanation of the PLNU procedures for academic dishonesty (http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Academic_Honesty).

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.

Final Exam: Date and Time

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. 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 change the exam date and time for that particular student.

The Final Exam is a Comprehensive Examination.



Schedule for Fall 2014 – Calculus III

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|--|--|---|--|---|--|
| September | 1 Labor Day (No Classes) | 2 | 3 Introduction 13.1 Vectors in the Plane | 4 | 5 13.2 Vectors in Space 13.3 Lines and Distance |
| | 8 13.4 The Dot Product | 9 | 10 13.5 The Cross Product 13.6 Matrices and Determinants | 11 | 12 14.1 The Conic Sections |
| | 15 14.2 Translation and Rotation of Axes | 16 | 17 14.3 Functions, Graphs, & Level Surfaces | 18 | 19 14.4 Quadric Surfaces |
| | 22 14.5 Cylindrical and Spherical Coordinates | 23 | 24 Review and Catch Up | 25 | 26 Exam 1 |
| | 29 14.6 Curves in Space Spiritual | 30 | 1 14.7 The Geometry and Physics of Space Curves Renewal | 2 | 3 15.1 Introduction to Partial Derivatives Week |
| | October | 6 15.2 Linear Approx. & Tangent Planes | 7 | 8 15.3 The Chain Rule | 9 |
| 13 16.1 Gradients & Directional Derivatives | | 14 | 15 16.1 Gradients & Directional Derivatives | 16 | 17 16.2 Gradients, Level Surfaces, and Implicit Differentiation |
| 20 Review and Catch Up | | 21 | 22 Exam 2 | 23 | 24 Fall Break |
| 27 16.3 Maxima and Minima | | 28 | 29 16.3 Maxima and Minima 16.4 Constrained Extrema | 30 | 31 16.4 Constrained Extrema and Lagrange Multipliers |
| November | | 3 17.1 The Double Integral and Iterated Integrals | 4 | 5 17.2 The Double Integral Over General Regions | 6 |
| | 10 17.4 Triple Integrals | 11 | 12 17.5 Integrals in Polar, Cylindrical, and Spherical Coordinates | 13 | 14 17.5 Integrals in Polar, Cylindrical, and Spherical Coordinates |
| | 17 17.6 Applications of Triple Integrals | 18 | 19 18.1 Line Integrals | 20 | 21 Review and Catch Up |
| | 24 Exam 3 | 25 | 26 | 27 Thanksgiving Day | 28 |
| | December | 1 18.2 Path Independence | 2 | 3 18.3 Exact Differentials | 4 |
| 8 18.5 Circulation and Stokes' Theorem | | 9 | 10 18.6 Flux and the Divergence Theorem | 11 | 12 Review |
| 15 | | 16 | 17 Final Exam 7:30-10:00 | 18 | 19 |