MAT 180 Syllabus

Semester:	Spring 2016
Course title:	Vector Calculus I
Instructor:	Professor Matt Klassen
Email:	mklassen@digipen.edu
Phone:	(425) 895-4423
Office hours:	MW 1:30-3:00 in Office, or by appointment
Course Web Page:	http://azrael.digipen.edu/MAT300
Time/Place:	T,Th 4:30-5:50, Hokusai; W 11:00-11:50 in Mathews

WEB PAGES AND MOODLE:

The Moodle page for MAT180 will contain a link to the course web page. The web page is the central repository for all course documents, including homework assignments. Updates to homework will be posted on the web page only. Scores for quizzes, homework, exams, and projects, will be posted through perl scripts on the course web page.

The Moodle page will be primarily used for chat, forums, and for submission of projects.

MATERIALS:

Text: None. The course is based on lecture material, notes, and homework.

Reference Materials (not required) :

Multivariable Mathematics, by Theodore Shifrin
Vector Calculus, 4th edition, by Susan Jane Colley

BACKGROUND MATHEMATICS:

Precalculus and Introductory Linear Algebra.

COURSE DESCRIPTION:

This course extends the standard calculus of one-variable functions to multi-variable vector-valued functions. Vector calculus is used in many branches of physics, engineering, and science, with applications that include dynamics, fluid mechanics, electromagnetism, and the study of curves and surfaces. Topics covered include limits, continuity, and differentiability of functions of several variables, partial derivatives, extrema of multi-variable functions, vector fields, gradient, divergence, curl, Laplacian, and applications.

COURSE GOALS AND OBJECTIVES:

1) Students will learn how to work with limits in three main contexts: sequences of points, slopes and tangents, and sums or integrals.

2) Students will apply concepts of calculus to solve problems involving functions and geometry as well as simulation.

3) Students will solidify their knowledge of functions and linear algebra and the geometry of transformations.

QUIZZES AND EXAMS:

Quizzes will be given periodically to test comprehension of lecture material. There are no make up quizzes, but I do drop your lowest two quiz scores. The quizzes will last for approximately twenty minutes.

For multiplie choice quizzes and exams, please follow these procedures: Work out the quiz problems and circle your answers on the question sheet. When you are finished, transfer the answers to the answer sheet. Go to a web browser and enter the answers online. Under no circumstances are you allowed to discuss the quiz questions with any other student during the quiz or the data entry process. You should turn in the answer sheet at the front of the room, and keep the question sheet for reference. Your scores will be posted online by your student ID.

There will be a midterm exam given during regular class hours, and a final exam. There are *NO* make up exams unless you have a *compelling and well documented reason* for missing a test.

Calculators are allowed on quizzes and exams.

GRADING:

Midterm Exam	20%
Final Exam	20%
Homework	20%
Quiz	20%
Projects	20%

Grades will be determined based on total course percentage. Percentage scores will determine letter grades according to the scale: (in the worst case)

A	$93-100$	A-	$90-92.9$		
B+	$87-89.9$	B	$83-86.9$	B-	$80-82.9$
C+	$77-79.9$	C	$73-76.9$	C-	$70-72.9$
D	$60-69.9$	F	<60		

ACADEMIC INTEGRITY:

Academic dishonesty, or cheating, occurs when a student represents someone else's work as their own, or assists another student in doing so. This can happen on exams, quizzes, homework, or projects. Academic dishonesty also may occur when a student uses any prohibited reference or equipment in the completion of a task. For example, the use of a calculator, notes, books or the internet when it is prohibited. Plagiarism is a common form of academic dishonesty. This can take the form of copying and pasting exerpts from the web, and representing them as original work. The type and severity of any occurence, as well as the legitimacy of any claim of academic dishonesty, will be judged by the instructor and the disciplinary committee. All students are asked to help in promoting a culture of academic integrity by discouraging cheating in all forms.

HOMEWORK ASSIGNMENTS:

Homework will be assigned and posted on the web page and collected weekly. You are responsible for checking the web page and noting the assignments and the due date. You may work on homework together, as well as consult the tutors and the instructor. However, the final work that you turn in must be your own work.

PROJECTS:

The full description of the programming project can be found on the course web page. Submission of projects should be in a zipped folder which contains source and executable and which can be uploaded on the Moodle page.

The required programming project is an illustration of Newton's method to find solutions to equations. There will also be optional extensions to this project as well as an extra-credit project.

COMPUTATIONAL RESOURCES:

You are encouraged to do linear algebra and other calculations for the homework using a calculator or symbolic package such as PARI. The symbolic algebra package PARI/GP is free and open-source. There is a link on the web page with examples of how to use PARI to do basic linear algebra calculations. Another package which includes PARI is called SAGE (Software for Algebra and Geometry Experimentation.)

DISABLED STUDENT SERVICES:

Students with physical, psychological or learning disabilities that affect their ability to perform major life activities associated with this class may be eligible for reasonable accommodations under the Americans with Disabilities Act. If you have a documented disability please contact the Disability Support Services office to arrange for accommodations for this class.

ATTENDANCE:

Attendance is required in all classes. Prior to missing a class students should email instructor with reason and request an excused absence. If this does not happen, the absence will be unexcused. If a student misses 10x% of scheduled classes, they will receive a reduction of x letter grades in their final grade in the course.

TENTATIVE WEEKLY TOPICS:

Week	Dates	Topics
1	Jan 5, 7	functions and transformations, open and closed sets in Euclidean space
2	Jan 12, 14	Limits, and continuity;
3	Jan 19, 21	Derivatives, tangent lines and planes, Newton's method;
4	Jan 26, 28	Partial and directional derivatives
5	Feb 2, 4	Differentiability and Rules of Differentiation
6	Feb 9, 11	Gradients and higher order partials, zeros of systems of equations
7	Feb 16, 18	Thursday: Midterm Exam;
8	Feb 23, 25	Extremum problems, derivative tests, Lagrange multipliers
9	Mar 1, 3	Complex numbers and complex functions
10	Mar 8, 10	limits and derivatives for complex functions
	Mar 14 - 18	Spring Break
11	Mar 22, 24	higher dimensional Newton's method
12	Mar 29-31	Divergence and Curl
13	Apr 5, 7	Del and other operators
14	Apr 12, 14	Exponential sums
15	Apr 19-22	Final Exams