

University of Portland

Department of Mathematics

Fall 2009

MTH 301A Vector Calculus

MWThF 8:10-9:05 in Franz Hall 206

INSTRUCTOR INFORMATION

Name: Aaron Wootton Office: BC278
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Official Office Hrs (BC278):

MWF 9:15-10:15
W 3:45-5:00
Th 10:00-11:00 & 12:00-1:00
or by appointment

Unofficial Office Hrs (BC278):

MWThF 11:00-12:00
F 3:45-4:45

Course Webpage: <http://faculty.up.edu/wootton/Calc3/VecA.html>

TEXT AND READINGS

Calculus: Multivariable Calculus, 6th ed., by James Stewart (Thomson Learning, 2008).
ISBN-13: 978-0-495-01163-7

TECHNOLOGY

The course requires the use of a graphing calculator. The TI-83, TI-84, TI-86, or TI-89 series are highly recommended.

COURSE/BULLETIN DESCRIPTION

The study of functions in three dimensional space, with an eye on applications. Topics covered are:

- (1) Ideas and tools of two- and three-space: vectors, dot product and cross product.
- (2) Scalar valued functions of several variables: contour maps, partial derivatives, gradients, optimization, integration and integration in different coordinate systems.
- (3) Curves and surfaces including their parameterizations.
- (4) Differentiation and integration of vector-valued functions: chain rule, line integrals, surface integrals, curl and divergence, the integrations theorems of Green, Stokes and Gauss.

(Prerequisite: MTH 202, Calculus 2)

COURSE OUTLINE

| | | |
|--------|-----------------------------------|-------------------------------|
| Ch. 13 | Vectors and the Geometry of Space | (§13.1-13.6) |
| Ch. 14 | Vector Functions | (§14.1 - 14.3) |
| Ch. 15 | Partial Derivatives | (§15.1 - 15.8) |
| Ch. 16 | Multiple Integrals | (§16.1 - 16.4 & 16.6 - 16.8) |
| Ch. 17 | Vector Calculus | (§17.1 - 17.5 & 17.7 - 17.10) |

COURSE PERFORMANCE OBJECTIVES

The first course in multivariable calculus provides students with an introduction to the methods and concepts of elementary differential geometry and functional analysis. Students will be familiar with elementary theory and proficient in its applications within mathematics and the applied sciences.

METHODS OF ASSESSMENT

Course performance objectives are assessed by traditional means: graded homework assignments, online homework using WeBWorK, regular quizzes, 3 hourly examinations, and a cumulative final exam. The development of analytical and logical reasoning skills are inherent in the nature of mathematics and are assessed in conjunction with the course performance objectives. Computational technology use is required for successful completion of assignments and examinations.

Meeting the course objectives will be done through lectures and other activities introducing new material, question and answer sessions, homework assignments, quizzes, and exams.

Attendance

Though I will not be taking attendance, you are expected to attend each class session. If you miss a class activity such as a quiz due to absence, you will be given zero points for that activity and no opportunity to make it up except under extreme circumstances. You are responsible for noting any information or changes announced in class. We will have class meetings on all scheduled class days, including the Friday prior to Fall Break and the Wednesday before Thanksgiving. Do not make plans to leave early for Fall Break. Do not make plans to leave at the end of the term before checking the final schedule. **You may not take the final at a time other than when it is scheduled by the university.**

Homework

Minimal passing homework score: Doing homework regularly and on time is crucial to your success in this class. For this reason, to encourage homework participation, you are **REQUIRED** to obtain a cumulative score of **AT LEAST 60%** on homework to pass the class - you will fail the class **REGARDLESS** of your grade on all other graded material if you do not achieve the minimal passing homework score.

Homework is split into TWO categories, Written Homework and WeBWorK.

WeBWorK (WW) WeBWorK is an online homework provider which can be accessed through any internet connection - you have an instruction sheet on how to work with WW attached to the Syllabus. The login page is <https://learning.up.edu/webwork2/MTH301C/> Alternatively, you can find a link to the login page from the course webpage. For each section, there are a list of homework problems on WW which need to be completed.

Written Homework (PP) will be assigned at the end of every section. The assigned problems from the book for each section are listed on your WeBWorK pages. When you log on to WeBWorK, click on the relevant section. In the top right hand corner will be a box which has a list of all questions for that section which are due from the book. If you have any issues finding the assigned homework, you need to see me immediately. I strongly suggest you do your homework regularly; it's best done following class, every day. The material will be fresh in your mind, and you will spend less time on each assignment. **Do not expect that we will cover each assignment in class. If you have homework questions, general or specific, you need to come and see me immediately.**

No late assignments will be accepted, except those approved by the instructor prior to the class meeting time. Homework is considered late and will not be accepted if it is not turned in by 4pm the day it is due. Arithmetic and analytical work may be given partial credit when you have shown some aptitude. However, **no** credit will be given on problems for which an answer is given with insufficient work displaying the steps and reasoning needed for a solution. Where appropriate, answers must be written using complete sentences.

Homework will be graded both for completeness and correctness

Homework assignments, as with anything which is turned in to the instructor, must be done neatly. Problems must be written in numerical order. If you use more than one sheet of paper, the pages **must** be stapled at the upper left corner. Paper clips or “paper stapling” are not sufficient. Do not turn in pages which have been torn from a notebook without first removing the “fringe” on the side of the page. You may, if you wish, work in groups on homework assignments. Please indicate the names of the students with whom you worked on the back of the last page of your assignment.

Homework which fails to meet these basic guidelines will automatically be graded down.

Due dates: On the day I finish teaching any section, all homework for that section is officially assigned (both WW and PP). For paper homework, the table below shows the day I will collect it according to which day it is assigned:

| Day Section is Completed | Homework Due Date |
|--------------------------|-------------------|
| Monday | Wednesday |
| Wednesday | Friday |
| Thursday | Monday |
| Friday | Tuesday |

It is your responsibility to be aware of due dates for homework – it will not always be possible to remind you in class.

WeBWorK homework will always close at 11:59pm on Sunday evening of the week it is assigned unless it is assigned on a Friday in which case it will close the following Sunday at 11:59pm.

Other Assignments As well as assigned PP and WW homework, from time to time you will be required to complete additional assignments in the form of additional WW sets and other types of written homework. Such assignments will count toward your homework grade. Additional sets will be assigned sporadically throughout the semester and will be announced in class.

Quizzes/Class Activities

Quizzes will be given frequently and generally unannounced. We will also have some in-class group activities which will count (in points) as quizzes. Quizzes will take one of the following formats:

- **Partner quizzes:** On some quizzes you will be able to work with a partner. Partner quizzes will generally be administered in class, though occasionally you will be able to finish them with your partner outside of class. As partners, you are expected to equally contribute to the quiz.
- **Traditional Quizzes:** At certain critical points of the semester, you will be given quizzes in class which you will have to complete on your own.
- **Group Quizzes** Some quizzes you will be able to work with a group of people. These quizzes will generally be take home quizzes. You are expected to meet with your group outside of class to work on the quiz and turn in solutions which all members have equally contributed to. You may also be asked as a group to present solutions on the board during class.

In addition to these quizzes, during the third meeting of class, you will take a Vector Calculus Diagnostic Quiz. This quiz will cover relevant topics from precalculus, Calculus 1 and Calculus 2. The quiz will count for 25% of your quiz grade.

There will be no make-up opportunities for quizzes or other in-class activities. If you miss a quiz, you will earn a score of zero. There will be TWO quizzes during the final week of class.

Examinations.

There will be three tests and one final examination. The tests are (tentatively) scheduled to cover the following material:

Test 1: Chapters 13 & 14

Test 2: Chapter 15 & 16.1-16.4

Test 3 : Chapter 16.6-16.8 & Chapter 17

The dates of the tests are tentative and the exact dates will depend upon the speed the relevant material is covered and will be announced in class. The final exam is cumulative and is scheduled at 10:30-12:30 on Tuesday 15th December.

CALCULATOR USE

Students will be allowed to use graphing calculators on at least 50% of major exams, on average. Further, they will be able to use graphing calculators for at least 50% of the final exam.

ACADEMIC DISHONESTY

Academic dishonesty will not be tolerated. Although students may study in groups and may discuss assignments with each other, all work turned in must be done by each student, individually.

POLICY ON MAKE UP EXAMS

I do not give make-up exams. There are two, and only two, exceptions. These are an absence due to extreme hardship or a University sponsored event. In the latter case, you must inform me at least one week in advance, and within the first week of the semester if you must miss the final exam. You may be asked to take the exam early. In case of extreme hardship (e.g. illness or death of a family member), please notify me in advance if at all possible. I reserve the right to deny make-up work and penalize absences that are not verified (health practitioner's note, police report, etc.)

GRADING STANDARDS

Final grades will be based on assignments and examinations as follows.

- Homework: WW: 100 points
PP: 100 points
- Quizzes: 100 points
- Midterms (2): 200 points each
- Final Exam: 300 points

The total number of points available is 1000. Final grades will be determined at the end of the semester, though will be no lower than those set forth in the following table PROVIDED the minimal passing homework score has been achieved.

| Points | Percent | Grade | Points | Percent | Grade |
|------------|--------------|-------|-----------|--------------|-------|
| 925 – 1000 | 92.5 – 100% | A | 900 – 924 | 90 – 92.4% | A- |
| 875 – 899 | 87.5 – 89.9% | B+ | 825 – 874 | 82.5 – 87.4% | B |
| 800 – 824 | 80 – 82.4% | B- | 775 – 799 | 77.5 – 79.9% | C+ |
| 725 – 774 | 72.5 – 77.4% | C | 700 – 724 | 70 – 72.4% | C- |
| 675 – 699 | 67.5 – 69.9% | D+ | 625 – 674 | 62.5 – 67.4% | D |
| 600 – 624 | 60 – 62.4% | D- | 0 – 599 | 0 – 59.9% | F |

GETTING HELP

Do *not* wait until the last minute to get help. Mathematics is a cumulative subject, and in particular, in this course material builds on prior knowledge. I have office hours in place during which you can stop by to get help on any problems. If you cannot make my office hours, make an appointment to see me for help. If you email me with a question (which is fine), please be specific about the problem – this text is heavy, and I may not have it at home with me, so emailing me that you need help with problem 42 won't get you very far. You also have the Learning Resource Center at your disposal. It is located in Franz 119, and will be staffed with math tutors who can help you. The department has also subscribed to hotmath.com, which you can use for homework help. I will give you a password in class so that you can use this online help system. Please do not abuse this resource.

In general, we will not take class time to go over questions on the homework. It is imperative that you come to see me with questions prior to the due date of the homework assignment.

WITHDRAWAL PROCEDURES

It is the student's responsibility to drop the course if he or she is no longer planning on attending the course or filling the other course requirements. In order to drop, the student must use an Add/Drop form available at the Registration Office. If a student does not properly withdraw from a course, he or she may receive an **F** for the course. A properly withdrawn student will receive a **W**.

INCOMPLETES

An incomplete (**I**) may be given when the quality of a student's work is satisfactory (**C** or better), but for some essential reason the course has not been completed by the student. An (**I**) is reserved for emergency situations only. To request an incomplete, the student needs a typed, signed and dated letter stating the reason(s) why an incomplete is appropriate. The letter should also contain the conditions for the completion of work. Acceptance of the request shall be at the instructor's discretion.

ACCOMODATION FOR DISABILITY

If you have a disability and require an accommodation to fully participate in this class, contact the Office for Students with Disabilities (OSWD), located in the University Health Center (503-943-7134), as soon as possible. You should also alert me to the accomodation plan.

UNIVERSITY OF PORTLAND'S CODE OF ACADEMIC INTEGRITY

Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity (*taken from the University of Portland's Code of Academic Integrity*) *The complete Code may be found in the 2005-06 University of Portland Student Handbook, as well as the Guidelines for Implementation. It is the student's responsibility to inform him or herself of the Code and Guidelines.*

Webwork Student Manual

Getting Started

- Logging in
 - (1) Go to the course webpage given on the syllabus and click on the link to the login page for webwork
 - (2) Type in your login and your password. Both your login and your password are your last name and the section. So for example, if I were in Section A, my login and password would be Woottona (be careful - it is case sensitive).
- Changing Your Password/ Setting Your E-mail
 - (1) Click on the Password/E-mail link on the left hand panel.
 - (2) Follow the instructions. Make sure you set the e-mail account you check the most - I will send you e-mails regarding Webwork through this.
- Doing Problem Sets
 - (1) Click on "Homework Sets" in the left hand panel.
 - (2) Click on the set you want to do.
 - (3) Click on the problem you want to do.
 - (4) Type your answers to the questions in the relevant blank boxes.
 - (5) If you hit "enter" or click on the "preview answer" button, Webwork will preview your answer(s) for you. This is helpful in tracking down errors. You can do this as many times as you like until you are happy with the answers.
 - (6) When you are ready, click the "submit" button. BE WARNED - some questions you will only have a couple of chances to answer, so make sure the answer you have previewed is the answer you want to submit BEFORE you submit it.
 - (7) After you submit your answers, Webwork will let you know whether you got the question right. If not, you can usually try again (until the due date) except for a small number of questions for which you will have a limited number of attempts.
 - (8) You can exit Webwork at any time using the logout button on the left hand panel.
- Printing Problem Sets
 - (1) You can download a hard copy of any problem set. You will need Adobe Acrobat Reader (which is free on the Web and on all university computers).
 - (2) To get a hard copy, click on the homework set you want a copy of. On the screen where the different questions are listed, there will be a link which reads "Download a Hard Copy of this Homework Set". Click this to get your hard copy.
 - (3) Answers will only be available AFTER the due date.
- Help with Webwork and other Features
 - (1) If the problem includes a picture that is hard to see, click the picture to get an enlarged version.
 - (2) Webwork understands many functions such as " $\sin(x)$ " and " $\ln(x)$ ". There is also special syntax used to answer questions (like how to express exponents). Most of the syntax and functions are fairly obvious, especially to those of you who are already familiar with computers. However, to be safe, I recommend printing the webpage <http://webwork.math.rochester.edu/docs/docs/pglanguage/availableFunctions.html> which has a list of all the functions webwork accepts.
 - (3) Some questions will have functions/syntax specifically tailored for that question, and it may differ from earlier similar questions. Make sure you always read the question in full to check you are using the right syntax.
 - (4) If you are stuck or convinced a problem is defective, you should stop by during office hours to discuss it with me. If this is not possible, use the e-mail instructor button at the bottom of the page to send me an e-mail outlining your problem. BE WARNED - the "e-mail instructor" button is for use when you are really stuck and absolutely cannot see me. Generally you should look at the questions way in advance of the due date and speak to me about any problems long beforehand. If you e-mail me five minutes before the due time, I will not be able to help you!!
 - (5) After the due date, the problem set closes and you will not be able to submit any answers for credit. A short time after the due date, the answers will become available so you can check your work.
 - (6) You can check your score on Webwork by clicking the "Grades" button on the left hand panel. It will show all scores on all sets assigned to this course.

Though at first it may be difficult to get the hang of, after time, I think you will really start to appreciate the different things Webwork has to offer that traditional pencil and paper homework does not. Also, remember, my office door is always open if you need help getting started. Good luck!