

# Multivariable Calculus (Math 273) — Fall, 2006

**Location and Time:** 210 Bouillon, MTWF, 8:00-8:50 A.M.  
103 Bouillon Th, 8:00-8:50 A.M.

**Instructor:** Dr. Dan Curtis

**Office:** 107a Bouillon

**Office Hours:** MTWThF 10:00-11:50 and by appointment. You can drop by my office at any time and usually I'll be able to talk with you. Also I often hold my office hours in the dining area in the Student Union. So if you don't find me in my office, try there.

**Office Phone:** 963-2125

**CWU e-mail:** [curtiswd@cwu.edu](mailto:curtiswd@cwu.edu)

**Web Page:** [www.cwu.edu/~curtiswd](http://www.cwu.edu/~curtiswd)

**Final Exam:** Wednesday, December 6, 8:00-10:00 am

**Textbook:** Calculus-single and multivariable by Hughes-Hallett et al, Fourth Edition.

**Calculator:** The TI-83+ is recommended but many others will do. Certain classroom demonstrations will be given using the TI-83+, so if you have a different calculator you will have to figure out how your calculator does things.

**Course Content:** The course will cover selected material from chapters 16-20 of the text, together with classroom handouts and additional material on applications. You will also be learning how to use the *Mathematica* software package to do many of the calculations in the course.

**Classwork and Homework:** You are expected to attend class daily. **Homework** will be assigned and graded. The **Problem Assignment** section of this syllabus indicates 10 assignments, each assignment being worth up to 5 points toward your final grade. The homework for a given week will be due on Friday by 5:00 pm. Late assignments will not be accepted.

**Mathematica in the Computer Lab:** Each Thursday we will meet in the computer lab (Bu 103). We will work with the *Mathematica* software package which will allow extensive experiments to gain familiarity with the ideas being studied. There will be five lab assignments that will count as part of your course grade. On days when we are in the computer lab, you will be provided with a *Mathematica* notebook that will contain various examples and exercises relevant to the current topic under discussion. You'll be able to download this notebook from my website (see above for the URL) and work in

that notebook during class. You should save your notebook so that you can work on it or refer to it later. Regarding saving notebooks, two important points:

- Save to your own personal file space (your CWU student account). Do not save anything on the local drive of the lab machine, as such files will automatically be deleted by the system each night.
- When you want to save your file, first delete all output cells. This is because files containing output, particularly graphics output, tend to be quite large. You will waste a lot of disk space and worse yet, you may cause *Mathematica* to corrupt your file and lose it completely. Any output can always be recreated by rerunning the notebook
- To evaluate all cells of a notebook, use  
Kernel>Evaluation>Evaluate Notebook
- To delete all output cells, use  
Kernel>Delete All Output.

On days when a lab assignment is made, you will have time to work on it during class. If you can't finish during class, you'll need to work on it outside of class. Note that in order to work on the notebook that comprises the assignment, you will need to have *Mathematica* available. Thus, unless you have your own copy of the software (as a student you can get your own copy for \$140) you may need to work in the lab.

On days when I am lecturing in Bu210, I may use *Mathematica* to present the lecture. If I do, I will make the notebook containing what I did in class available on my website for you to download.

**Learner Outcomes:** After completing this course, the student will understand:

- how to set up and compute multiple integrals
- how to set up and compute integrals in cylindrical and spherical coordinates
- how to describe motion in the plane or in space using parametrized curves
- how to describe surfaces in space in parametric form
- what a conservative field is and how path independence relates to existence of a potential
- what a flux integral is and how to compute flux integrals over parametric surfaces
- what the divergence and curl of a vector field are
- how to apply the Divergence Theorem and Stokes Theorem

**Students with disabilities:** If you require accommodation based on a documented disability, have emergency medical information to share, or need special arrangements in case of emergency evacuation, please make an appointment with me as soon as possible.

**Grading:** Your course grade will be determined by the following:

1. Two 100-point in-class exams.
2. Five Computer Lab assignments, worth 10 points each for a total of 50 points.
3. Ten homework assignments, worth 5 points each, for a total of 50 points.
4. A final exam worth 100 points.
5. Extra credit assignments may be made during the quarter, allowing you to earn extra points.

A perfect score on the first four of the above categories would result in a total of 400 points. Your course grade will be determined by the percentage  $p$  of these points you earn, according to the following scale.

|                    |    |                    |    |
|--------------------|----|--------------------|----|
| $90 \leq p$        | A  | $65 \leq p < 77.5$ | C  |
| $89 \leq p < 90$   | A- | $64 \leq p < 65$   | C- |
| $87.5 \leq p < 89$ | B+ | $62.5 \leq p < 64$ | D+ |
| $80 \leq p < 87.5$ | B  | $50 \leq p < 62.5$ | D  |
| $79 \leq p < 80$   | B- | $p < 50$           | F  |
| $77.5 \leq p < 79$ | C+ |                    |    |

**Policy on Missed Exams:** If you must miss an exam, you should let me know **in advance**. This can be done by email, voicemail, or in person. You must have a **legitimate reason** for missing the exam. In such cases a makeup exam may be given.

**Policy on Partial Credit on Exam Problems:** In cases where an exam question is not answered correctly, partial credit may be given. This will only be done in cases where the attempted solution was substantially correct, both with respect to method and computations. Partial credit will **not** be given simply because something that was written was correct; a correct line of attack and generally correct calculations are required.

**Policy on showing work to receive credit:** Every answer given **must** be justified by showing how it was obtained, with enough detail to convince the reader that the answer was obtained in a logically correct manner. **If sufficient work is not shown, no credit will be given for the answer, even if the answer is correct!**

**Class Schedule (49 class days)**

| <b>Date</b> | <b>Class Activity</b> | <b>Date</b> | <b>Class Activity</b>          |
|-------------|-----------------------|-------------|--------------------------------|
| 09/18       |                       | 10/30       |                                |
| 09/19       |                       | 10/31       |                                |
| 09/20       | Classes begin         | 11/01       |                                |
| 09/21       |                       | 11/02       |                                |
| 09/22       |                       | 11/03       | HW 7 due; Lab 4 due            |
|             |                       |             |                                |
| 09/25       | HW 1 due              | 11/06       |                                |
| 09/26       |                       | 11/07       |                                |
| 09/27       |                       | 11/08       |                                |
| 09/28       |                       | 11/09       |                                |
| 09/29       | HW 2 due              | 11/10       | Holiday: Veteran's Day         |
|             |                       |             |                                |
| 10/02       |                       | 11/13       | Exam 2                         |
| 10/03       |                       | 11/14       |                                |
| 10/04       |                       | 11/15       |                                |
| 10/05       |                       | 11/16       |                                |
| 10/06       | HW 3 due; Lab 1 due   | 11/17       | HW 9 due; Lab 5 due            |
|             |                       |             |                                |
| 10/09       |                       | 11/20       |                                |
| 10/10       |                       | 11/21       |                                |
| 10/11       |                       | 11/22       | Thanksgiving Break             |
| 10/12       |                       | 11/23       | Thanksgiving Break             |
| 10/13       | HW 4 due              | 11/24       | Thanksgiving Break             |
|             |                       |             |                                |
| 10/16       | Exam 1                | 11/27       |                                |
| 10/17       |                       | 11/28       |                                |
| 10/18       |                       | 11/29       |                                |
| 10/19       |                       | 11/30       |                                |
| 10/20       | HW 5 due; Lab 2 due   | 12/01       | HW 10 due; Last day of classes |
|             |                       |             |                                |
| 10/23       |                       | 12/04       | Prof. Dev./ Student Study Day  |
| 10/24       |                       | 12/05       |                                |
| 10/25       |                       | 12/06       | Final Exam (8:00-10:00 am)     |
| 10/26       |                       | 12/07       |                                |
| 10/27       | HW 6 due; Lab 3 due   | 12/08       |                                |

# Problem Assignments

| Assignment | Section | Problems         |
|------------|---------|------------------|
|            |         |                  |
| 1          | 16.1    | 2,4,9,14,16      |
|            | 16.2    | 2,4,6,7,15       |
| 2          | 16.3    | 1,2,5,6,14       |
|            | 16.4    | 1,2,5,12,14      |
| 3          | 16.5    | 1,2,8,9,10,15,16 |
|            |         |                  |
|            | 17.1    | 1,4,14,22,32     |
| 4          | 17.2    | 6,9,16,27,28,29  |
|            | 17.3    | 2,4,12,18,19     |
| 5          | 17.4    | 1,2,3,10,12      |
|            | 17.5    | 2,4,13,18,20     |
|            | 18.1    | 1,3,6,8,12,16    |
| 6          | 18.2    | 1,2,4,5,6        |
|            | 18.3    | 1,2,3,4,5        |
|            |         |                  |
| 7          | 18.4    | 1,3,4,6,7        |
|            | 19.1    | 2,4,6,10,12      |
|            | 19.2    | 2,3,5,6,7        |
| 8          | 19.3    | 1,2,3,4,8        |
|            | 20.1    | 1,2,4,6,8        |
|            |         |                  |
| 9          | 20.2    | 2,3,4,8,9        |
|            | 20.3    | 2,4,6,7,13       |
|            |         |                  |
| 10         | 20.4    | 2,3,4,7,8        |
|            | 20.5    | 1,2,6,8,10       |
|            |         |                  |