Mathematics. The science of patterns.

Math 224, Calculus IV

Instructor Information
Eric Schulz, 509-527-4281, eric@wwcc.edu, Office #288A located in the Academic Support Center on the 2nd floor of the Main Building on WWCC’s Walla Walla campus. My office hours are 10:30 to 11:30 daily. I am also available in the afternoons on an appointment basis; please contact me via email or phone to arrange an appointment if you are unable to come by during posted office hours. I normally respond to email promptly during the day but rarely in the evenings and on weekends. If you send an email in the evenings or weekends I will reply as soon as I can on the following work day.

Course Description
An introduction to multi-variable calculus. Topics for the course include: vector-valued functions, partial derivatives, directional derivatives, multiple integration, vector analysis, line and surface integrals, Green's theorem and Stoke's theorem.

1. Work with two and three-dimensional vectors algebraically and geometrically: magnitudes, directions, dot products, vector products.
2. Graph, analyze, and perform calculus operations on two and three-dimensional parametric functions of a single variable.
3. Graph, analyze, and perform calculus operations on two and three-dimensional vector-valued functions of a single variable. Understand the connections between vectors representing position, velocity, and acceleration.
4. Analyze completely, and be able read, generate, and interpret graphs for functions of two or more variables: surface plots, contour plots, evaluate partial derivatives, find extremums, evaluate directional derivatives, and gradients.
5. Setup and evaluate multiple integrals over generalized domains of integration described in rectangular, polar coordinates, cylindrical, and spherical coordinates.
6. Setup, evaluate, and interpret line integrals and surface integrals.
7. Green's Theorem, the Divergence Theorem, and Stoke's Theorem.

The course will include use of the computer algebra software Mathematica. Mathematica is available on all computers in Room 207, a limited number of computers in Room 221, and all computers in Room 288 on campus. For those students with a computer at home and planning to take several of the advanced math courses at WWCC, purchasing a student edition of Mathematica is suggested. Mathematica will be used throughout the calculus sequence (Math 124/125/126/224) and will continue to be used in Linear Algebra (Math 220) and Differential Equations (Math 238) at WWCC. Mathematica for Students version 5.2 can be ordered either from the WWCC College Bookstore or from http://www.wolfram.com/ for approximately $140.

Advanced math courses at WWCC:
Required Materials

1. The textbook for the course is Calculus Concepts & Connections, 1st edition, Smith/Minton. The textbook is used for Math 124, 125, 126, and 224.
2. A graphing calculator will be necessary. There are many different calculators that are sufficient for the needs of the course. Please feel free to contact the instructor with any questions about calculators.
3. Engineering Computation paper for homework assignments, pencil, etc. Available in the WWCC Bookstore for approximately $2.50 for a 100-sheet pad.

Attendance

Attendance at every class session is expected. I understand absences are sometimes unavoidable and will work with students when such occasions arise. In the event of an absence occurring on the date of a scheduled exam or quiz, prior arrangements must be made in order to schedule another time to write the exam.

Cell Phones/PDAs

Our classroom is a No Cell Phone/PDA environment. Cell phones are to be silenced before class begins and put away. Cell phones/PDAs are not to be accessed for any reason during classtime. Text messaging is not allowed during class. Using a cell phone/PDA as a calculator is not acceptable - you should have a scientific calculator for use in the course. Develop the habit of silencing your phone when entering the classroom - I’m confident that everyone can manage to go 50 minutes without accessing their cell phone!

Our classroom is equipped with computers. We will use the computer resources at various times throughout the course for course activities. Other use of the computers is not to occur during class - no checking email, no instant message, no web browsing, no gaming, and no working on online homework assignments during class time.
Homework Assignments and Quizzes

Homework assignments comprised of textbook problems will be given regularly and discussed in class. These homework assignments will not be collected by the instructor. Quizzes will be given to evaluate mastery of the material. The problems included on quizzes will likely include problems from textbook assignments, but may also contain new problems written by the instructor. Quiz problems may also require that students use Mathematica. Some quizzes will be scheduled and completed in class, some quizzes will be given unannounced, and some will be handed out to be completed outside of class. If a student reads and summarizes their textbook material regularly, completes the homework assignments on time, and pays attention in class (taking notes, asking questions, etc), then the likelihood of doing well on quizzes will be high. However, if a student does not read their textbook, does not complete homework assignments on time and is not "involved" mentally during lectures, then it is likely that their quiz performance will be poor and their course grade will reflect their poor study habits.

Exams

There will be 3 exams and a comprehensive final exam. Each one-hour exam will be composed of an in-class portion and a second portion that is to be completed outside of class and will require the use of Mathematica. Each one-hour exam will be worth 125 points with the breakdown between in-class and take-home stated on each exam. The final exam is worth 200 points.

Grades

Grades for the course are computed by adding up the number of points earned and dividing by the total number of points possible in the course. Final grades are simply a function of the percentage of possible points earned. Let \( p \) be the percent of the possible course points earned by a student, the course grade is then given in the following table:

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\begin{align*}
93\% & \leq p \leq 100\% \rightarrow A \\
90\% & \leq p < 93\% \rightarrow A- \\
87\% & \leq p < 90\% \rightarrow B+ \\
83\% & \leq p < 87\% \rightarrow B \\
80\% & \leq p < 83\% \rightarrow B- \\
77\% & \leq p < 80\% \rightarrow C+ \\
73\% & \leq p < 77\% \rightarrow C \\
70\% & \leq p < 73\% \rightarrow C- \\
67\% & \leq p < 70\% \rightarrow D+ \\
60\% & \leq p < 67\% \rightarrow D \\
0\% & \leq p < 60\% \rightarrow F
\end{align*}
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