Mathematics. The science of patterns.

Math 125, Calculus II

Course Description

A continuation of MATH 124. Topics for the course include: an introduction to the definite integral (optional), applications of the definite integral, differentiation and integration of logarithmic, exponential, trigonometric, and hyperbolic functions, and techniques of integration.

1. Successfully develop a practical understanding of the definite integral.
a. Limit of Riemann sums.
b. Connection between the derivative and the definite integral.
c. Compute the definite integral numerically using appropriate technological tools.
d. Properties of the definite integral and its interpretation as area.
e. "Going backward" from a derivative to the original function, first graphically and numerically, then analytically.

2. Successfully apply the symbolic methods of integration.
a. Antiderivatives and the Fundamental Theorem of Calculus.
b. Integration by Substitution.
c. Integration by Parts.
d. Tables of integrals.
e. Integration using a computer algebra system (CAS).
f. Approximating definite integrals.
g. Convergence and divergence of improper integrals.

3. Successfully apply the integral in solving problems including, but not limited to, the following:
a. Areas enclosed by functions.
b. Volumes of solids of revolution using cylindrical shells, discs, and or washers. Volumes of solids that are not solids of revolution using slicing techniques.
c. Arc length of functions and parametric curves in the plane.
d. Common applications of the integral in physics (work, pressure, etc.)

4. Technology skills integrated into the course include, but are not limited to, the following: Using a CAS to evaluate numeric integrals via Riemann Sums, evaluate integrals, solve multi-step problems, and document problem solutions.

5. Optional (to be included in either Math 125 or 126 but not both): Successfully solve first-order differentiql equations graphically (slope fields), numerically (Euler's method), analytically (separation of variables), all in the context of substantial applications.

Required Materials

Textbook: The textbook for the course is **Calculus (Early Transcendentals)**, 1st edition, by Jon Rogawski, W.H. Freeman. The textbook is available in the WWCC Bookstore for approximately $120 and is used for all four calculus courses Math 124, Math 125, Math 126, and Math 224.

Engineering Computation Paper: All handwritten work that is turned in for credit must be written on Engineering Computation Paper. The WWCC Bookstore, Whitman Bookstore, and Walla Walla University (College) Bookstore stock this paper.

Graphing Calculator: A graphing calculator will be required. It is assumed that all calculus students know how to use their graphing calculator. If this is not the case, then be sure to contact the instructor to arrange for a quick tutorial. Use of a calculator will not be discussed in class, however, use of a computer algebra system (Mathematica 7) is required and expected.

Mathematica 7: We will be working with Mathematica 7 throughout the four course calculus series (Math 124/125/126/224), linear algebra (Math 220), and differential equations (Math 238). Mathematica 7 is accessible currently on computers in Room 207 and in the Math Lab. A home license of Mathematica 7 is provided to for all students and install DVD's can be purchased from the WWCC Bookstore for $1.99. All course related materials such as lecture notes, interactive mathematical explorations, handouts, assignments, exam reviews, exams, exam solutions, and the like are Mathematica 7 notebooks.

Email Address: All course related emails will be sent to your WWCC Student Email address. Information about how to activate and use your WWCC Student Email Account can be found by going to WWCC's homepage and selecting Webmail in the Quick Links drop down list. As long as students and the instructor use their college email addresses course communication we can be reasonably assured that each others emails will not by blocked by a spam filter or moved in a junk mail folder.

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, **prior** arrangements must be made in order to schedule another time to write the exam.

Cell Phones, PDA's, and Computer use during class

Our classroom is a no cell phone, PDA, or other portable electronic device (other than a calculator) environment. **Cell phones are to be silenced before class begins and put away in a backpack, purse, pocket - laying in the open on a table is not OK. Vibrate mode is not acceptable**. **Text messaging is not allowed during class as it can be distracting not only to you but to those around you as well**. 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 touching their cell phone!

Our classroom is equipped with computers that will be used during class sessions for material related to calculus. Unless directed to use a computer during class, the machines should not be used. This means that web surfing, checking your email, using social networking sites (MySpace, Facebook, etc.), etc. is off limits during class time.

Textbook Reading

Each assigned section of our textbook should be read completely. Rather than using the textbook as a simple collection of exercise sets you should try reading, highlighting, and studying the material between exercise sets! This use of a mathematics text is perhaps a novel idea for many students, but with the new terminology and ideas being presented in calculus I would highly recommend heavy usage of the text.

Homeworks, projects, and exams

There will be three one-hour exams and a comprehensive final exam. Each of the exams will be comprised of an in-class portion done on paper using your brain, pencil, and graphing calculator and a take-home portion that will require the use of Mathematica. As should be expected there will be additional homework problems assigned with some being turned in for credit/grading as well as other assigned projects that will often require the use of Mathematica.

Grades

Course grades are simply a function of the percentage of possible points earned on all homeworks, projects, and exams.
CoursePercentage = (SumOfPointsEarned)/(TotalOfPointsPossible)
You can easily monitor your current grade status using a piece of paper on which you keep a running tally of your point total and point possible, an Excel spreadsheet, or even a Mathematica notebook. Let p be the percent of the possible course points earned by a student, the course grade is then given in the following table:

93% <= p<=100% ->A
90% <= p <93% -> A-
87% <= p <90% -> B+
83% <= p < 87% -> B
80% <= p < 83% -> B-
77% <= p < 80% -> C+
70% <= p < 77% -> C
67% <= p < 70% -> D+
60% <= p < 67% -> D
0% <= p < 60% -> F