Mathematics. The science of patterns.

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Math 124, Calculus I

Instructor Information

Eric Schulz, 509-527-4281, Office #16A located on the first floor on the Main Building on WWCC's Walla Walla campus - located in lower left area of the 1st Floor building map. My office hours are 1:00 to 2:00 daily. Please contact me via email or phone to arrange an appointment if you are unable to come by during my normal 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

Calculus with Analytical Geometry I is the first in a series of four courses designed for students planning to major in engineering, mathematics, or the sciences. Graphical analysis of concepts is emphasized through the use of technology throughout the course. Topics for the course include: limits and continuity, derivatives and their applications.

1. Analyze the following families of functions. Special attention should be given to each function's individuality: the shape of its graph, characteristic properties, comparative growth rates, and general uses.
a. Linear functions.
b. Power and root functions.
c. Exponential and logarithmic functions.
d. General polynomial functions.
e. Rational functions.
f. Trigonometric functions.
g. Inverse functions.

2. Successfully apply the following actions to functions from each family listed above.
a. Read graphs and think graphically.
b. Read tables and think numerically.

c. Algebraic skills.
d. Modeling the real world.

3. Successfully apply the following actions to functions from each family listed above both in an algebraic context as well as graphical context.
a. The arithmetic operations addition, subtraction, division, and division.
b. Function composition.
c. Transformations and translations of the type A f(B x+C)+D where f is a function from the families listed above and A,B,C, & D are real numbers.

4. Successfully apply the concept of a derivative to each of the families of functions listed above.
a. Find derivatives numerically (by taking arbitrarily fine difference quotients).
b. Visualize derivatives graphically as the slope of the graph.
c. Interpret the meaning of the first and second derivatives in various applications.
d. Understand local linearity.
e. Recognize the derivative as a function in its own right.

5. Successfully apply the symbolic methods of differentiation to each of the families of functions listed above.
a. Formulas for derivative functions.
b. Powers and polynomials.
c. Product rule.
d. Quotient rule.
e. Chain rule.
f. Implicit differentiation.

6. Successfully apply the derivative in solving problems.

7. "Going backward" from a derivative to the original function, first graphically and numerically, then analytically.

8. Technological skills integrated into the course include, but are not limited to, the following: Effectively use computer graphing software to explore graphs of functions, to analyze their basic characteristic and properties, and to become more successful in problem solving. The primary technological tool used in the course is Mathematica. Use of Mathematica to write technical documents containing text, formatted mathematics, computations, and graphs will be stressed throughout the year-long calculus series.

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. We also have the opportunity to experience an online site called CalcPortal designed specifically for our text where the text is accessible in electronic form and additional supplements such as a student solution manual are accessible. Additional information about CalcPortal will be provided within a few days.

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. Calculator usage will not be discussed in class.

Mathematica 6: We will be working with Mathematica 6 throughout the four course calculus series (Math 124/125/126/224), linear algebra (Math 220), and differential equations (Math 238). Mathematica 6 is accessible currently on computers in Room 207 and in the Math Lab. A new site license is being purchased that will provide all WWCC students with their own copy of Mathematica 6 that can be installed on their own home computer - it will not be necessary to purchase a copy of Mathematica 6. All course related materials such as lecture notes, interactive mathematical explorations, handouts, assignments, exam reviews, exams, exam solutions, and the like are Mathematica 6 notebooks. We will begin working through an introductory tutorial for Mathematica 6 in the first and second weeks to become familiar with Mathematica

with assigned activities coming thereafter.

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 exams (one over chapter 2, another over chapter 3, and a third over chapter 4) 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. The weight of each assignment in points will be stated clearly when the activity is assigned.

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

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