

MATHEMATICS 122
CALCULUS FOR BUSINESS ADMINISTRATION AND SOCIAL SCIENCES

BULLETIN INFORMATION

MATH 122: Calculus for Business Administration and Social Sciences (3 credit hours)

Course Description:

Derivatives and integrals of elementary algebraic, exponential, and logarithmic functions. Maxima, minima, rate of change, motion, work, area under a curve, and volume.

Prerequisites: placement code MB4-9 required; earned by grade of C or better in MATH 111/111I, or by Algebra Placement Test

SAMPLE COURSE OVERVIEW

You will find that this course is very different from other math courses that you have taken. We will be less concerned with the mechanical aspects of computation (that's what machines or specialists are for!), and much more concerned with why we want to do these calculations. Most of you will not be called upon to do technical calculations yourself, but as a business manager, let's say, or a research biologist, you will hire or work with technical staff. It is crucial that you learn how to communicate with them, in outlining a problem, and in understanding and questions, their proposed solution. In other words, the most important thing for you to take away from this course is an ability to speak and write in a technical language.

In terms of course material, we will form a mathematical model of a changing "real world" situation, using the calculus concepts of derivative and integrals to analyze it, and then interpret our calculated results in the context of the original problem. A blend of numerical (number crunching, often with the help of a calculator), graphical (again, also often with the help of a calculator), and analytic methods (manipulation of formulas) will help us solve problems and understand concepts. Finally, in the real world, problems and solutions must be communicated effectively, both in writing and orally. You will also have the opportunity to work in groups, and you may discover that math can be a social activity! The text preface gives the authors' perspective and is well worth reading.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Math 122, students will be able to:

1. Recall basic mathematical terms related to elementary algebraic, exponential, and logarithmic functions, and derivatives and integrals of such functions and express these terms in correct context.
2. Apply the methods of calculus to solve applications involving maxima, minima, rates of change, motion, work, and area under a curve.

3. Verbally interpret data given as graphs, tables, and equations and put into words the relationship between a function and its derivative or integral given in these forms as well.
4. Utilize a graphing calculator to solve problems, locate maxima and minima of a function, and analyze change in a function.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. *Applied Calculus* (4th Edition) by Hughes-Hallett, Gleason, Lock, Flath, et al.
2. Students will also need a graphing calculator and access to a computer with internet access and a printer. Calculators may be used on quizzes and tests, except as otherwise instructed in class. The TI-83 or TI-84 is highly recommended. Use of the TI-89, TI-Nspire CAS, or other calculator with built-in CAS (computer algebra system) is prohibited. Cell phone calculators will not be allowed on quizzes or tests. You will be asked to clear the memory in your calculator prior to each test.

SAMPLE ASSIGNMENTS AND/OR EXAM

Students are expected to read assigned sections in the text and complete weekly homework assignments and quizzes. Students should check Blackboard frequently for announcements and course documents such as quiz solutions and worksheets.

1. **Homework:** There will be a weekly homework assignment to be handed in. Students will need to print this from Blackboard. Assignments are due at the beginning of class. In addition, suggested problems will be announced, but not collected.
2. **Quizzes:** There will be a weekly written quiz. Students will complete quizzes individually, unless stated otherwise in class.
3. **Test:** There will be three tests throughout the semester and a final cumulative exam.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Class 1:	1.1	Functions
Class 2:	1.2	Linear Functions
Class 3:	1.3	Rates of Change HW 1 Due
Class 4:	1.4	Applications in Economics Quiz 1
Class 5:	1.5	Exponential Functions HW 2 Due
Class 6:	1.6	The Natural Logarithm

Quiz 2

Class 7:	1.7	Exponential Growth and Decay
Class 8:	1.8/1.9	Shifting Techniques & Families of Functions HW 3 Due
Class 9:	2.1	Instantaneous Rate of Change Quiz 3
Class 10:	2.1 / 2.2	Instantaneous Rate of Change / The Derivative Function
Class 11:	2.2	The Derivative Function HW 4 Due
Class 12:	2.3	Interpretations of the Derivative Quiz 4
Class 13:		Review
Class 14:		Test #1
Class 15:	2.4	The Second Derivative
Class 16:	2.5	Marginal Cost and Revenue
Class 17:	3.1	Power Rule for Differentiation
Class 18:	3.2	Derivative Rules for logs and exponentials
Class 19:	3.3	The Chain Rule
Class 20:	3.4	Product and Quotient Rules HW 5 Due
Class 21:	4.1	Local Maxima and Minima Quiz 5
Class 22:	4.2	Inflection Points
Class 23:	4.3	Global Max and Mins HW 6 Due
Class 24:	4.4	Profit, Cost and Revenue Quiz 6

Class 25:	4.5	Average Cost
Class 26:		Review HW 7 Due
Class 27:		Test #2
Class 28:	5.1	Accumulated Change
Class 29:	5.2	The Definite Integral
Class 30:	5.3	Definite Integral as Area
Class 31:	5.4	Interpretations of the Integral
Class 32:	5.5	Fundamental Theorem of Calculus HW 8 Due
Class 33:	7.1	Anti-derivative Formulas Quiz 7
Class 34:	7.2	Integration by Substitution
Class 35:	7.3	Using the Fundamental Theorem to Compute Integrals HW 9 Due
Class 36:	7.4	Integration by Parts Quiz 8
Class 37:		Review
Class 38:		Test #3
Class 39:	6.1	Average Value
Class 40:	6.2	Consumer and Producer Surplus
Class 41:		Review
Class 42:		Review
FINAL EXAM		<u>Final Exam according to University exam schedule</u>

