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**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** **Final Exam according to University exam schedule**