**College of Science and Health  
Department of Mathematics  
Course Outline**

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| **1.** | **Title of Course, Course Number and Credits:** Basic Calculus with Applications -  MAEN 5070, 3 credits. |
| **2.** | **Description of Course:** Designed for the student who wishes to investigate the concepts and techniques of elementary calculus. Topics include real number system, function of one variable, limits and continuity, differentiation, antidifferentiation, integration, and applications. |
| **3.** | **Course Prerequisites:** [MAEN 506](http://www.wpunj.edu/cos/math/outlines/maen506.htm)0 - Elementary Function Theory |
| **4.** | **Course Objectives:** This course is designed to give teachers an introduction to the ideas of calculus with changing rates and use of infinity as opposed to the algebra courses taught in high school which are concerned with constant rates and finite processes. |
| **5.** | Student Learning Outcomes. Students will be able to:   |  |  | | --- | --- | |  | Use real-world data to create mathematical models | |  | Predict results based on the given data | |  | Make and test conjectures | |
| **6.** | **Topical Outline of the Course Content:**   1. Functions; the straight line and linear Functions; intersections of graphs 2. Limits, continuity, and rates of change 3. The derivative: definition, techniques of differentiation, the Chain rule, and implicit differentiation. 4. Applications of the derivative: increasing and decreasing functions, extreme values, the second derivative, curve sketching, optimization problems, and the differential. 5. Exponential and logarithmic functions, their derivatives, applications. 6. Antidifferentiation, integration by substitution, integration by parts 7. The definite integral, properties area problems. |
| **7.** | **Guidelines/Suggestions for Teaching Methods and Student Learning Activities:** This course is taught as a lecture course. Computers will be incorporated for classroom demonstrations, for solving problems that require large amount of computations and for testing models. |
| **8.** | **Guidelines/Suggestions for Methods of Student Assessment (Student Learning Outcomes)**   1. Three short projects will be given. 2. A final project will be given. The topic of the final project will be chosen by the students and approved by the instructor. 3. Short quizzes and some homework will be counted towards the final grade. |
| **9.** | **Suggested Reading, Texts and Objects of Study:**   1. *Calculus*, Second Edition, Robert T. Smith and Roland B. Minton, McGraw-Hill (2002) 2. TI-85, TI-86 or TI-89 GraphicsCalculator. 3. The student version of **MATHEMATICA** (Optional) |
| **10.** | **Bibliography of Supportive Texts and Other Materials:**   1. *Calculus, A New Horizon*; Anton, Howard, John Wiley & Sons, Inc. 2. *Calculus, Single Variable*, Third Edition, Hughes-Hallet; Gleason, M. et al, John Wiley & Sons, Inc. (2002) 3. *Calculus of Single Variable*, Seventh Edition; Larson, Hostetler, and Edwards, Houghton Mifflin Com. (2002) |
| **11.** | **Preparer’s Name and Date**: Dr. Beva Eastmanl, Fall 1982 |
| **12.** | **Original Department Approval Date**: Fall 1982 |
| **13.** | **Reviser’s Name and Date:** Dr. Marcelo Llarull, Fall 2001 |
| **14.** | **Departmental Revision Approval Date:** Fall 2001 |
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