122 – Introduction to Calculus

Course Description from Bulletin: Basic concepts of calculus of a single variable; limits, continuity, derivatives and integrals. Applications. (3-1-3)

Enrollment: This course does not count for graduation in any engineering, mathematics, natural science or computer science degree program

Textbook(s): Calter & Calter, *Technical Mathematics with Calculus*, 6th ed., Wiley & Sons, 2011.

Other required material: None

Prerequisites: None

Objectives:

1. Students will learn to compute the derivative using the limit definition.
2. Students will learn to compute derivatives using the basic formulas.
3. Students will learn to compute tangent lines to graphs as local linear approximations.
4. Students will learn to find extreme points of functions.
5. Students will learn the basic algebraic properties of the logarithmic and power functions and their derivatives.
6. Students will learn to compute basic antiderivatives.
7. Students will learn to use substitution to evaluate definite and indefinite integrals.
8. Students will learn to find areas of regions in rectangular and polar coordinates using the definite integral.

Lecture schedule: Three weekly 75 minute sessions, which may vary on a weekly basis between one to two 75 minute lectures and one to two 75 minute workshop sessions.

Course Outline:	Hours
1. Basic properties of linear, quadratic, and piecewise functions including their compositions, limits and graphs	7
2. Derivatives – limit definition and rules for computation	7
3. Basic applications of the derivatives as a rate of change	4
4. Chain rule and implicit differentiation	7
5. Graph sketching in Cartesian coordinates; optimization	7
6. Polar plotting – the slope and inclination of a polar curve	4
7. Antiderivatives and the definite integral	
8. Applications of the integral to finding areas and lengths in rectangular and polar coordinates	4
9. Separable differential equations – application to find the deflection of a uniform beam	2

Assessment:		
	Homework/Quizzes	10%
	Worksheets/Projects	25%
	Tests	40-50%
	Final Exam	20-30%

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