Education within the reach of all
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Syllabus

Course Title **CALCULUS DIFFERENTIAL (CALCULUS I)**

I. Objective:

The purpose of this course is to help the student master the concepts of limits, derivatives of single and multiple variables, and more.

II. Materials and Books:

The course will use the textbooks "Calculus" by Ron Larson and "Calculus" by James Stewart.

III. Course Content:

1 Limits and Their Properties:

1.1 Definitions of the concept of limits

1.2 Calculation of limits graphically and numerically

1.3 Analytical calculation of limits

1.4 Continuity and lateral limits

1.5 Continuity and lateral limits

1.6 Limits of multivariable functions

2 Differential Calculations

2.1 Derivative and the problem of the tangent line

2.2 Fundamental rules of rate of change or rate of variation

2.2 Product and quotient rules, and higher order derivatives

2.3 Chain rule or derivative of a composite function

2.4 Implicit differentiation

3 Applications of the derivative

3.1 Extrema on an interval

3.2 Rolle's theorem and the mean value theorem

3.3 Increasing and decreasing functions and the first derivative test

3.4 Concavity and the second derivative test

3.5 Limits at infinity

4 Derivatives of logarithmic, exponential, and other transcendental functions

4.1 Logarithmic functions and their derivatives

4.2 Exponential functions and their derivatives

4.3 Inverse trigonometric functions and their derivatives

4.4 Hyperbolic functions

5 Differential equations, definition, and L'Hôpital's rule

6. Partial derivatives and applications of partial derivatives.