

MAT 120: Calculus and Analytic Geometry-I (Calculus-I)

Course Description: Tangent lines; limits and continuity; differentiation: definition, basic rules, chain rule, rules for trigonometric, inverse trigonometric, exponential and logarithmic functions; implicit differentiation; rates of change, related rates problems, linear approximation and differentials; L'Hospital's rule; concepts of local and absolute maximum and minimum including first and second derivative tests; integration: definition, anti-differentiation, area; integration by simple substitution; Fundamental Theorem of Calculus.

Credit hours: 3

Pre-requisites: N/A (We recommend taking MAT 116 before MAT 120 or in the same semester)

Contents:

1. Functions, Families of Functions: Exponential, Logarithmic, Trigonometric functions and their inverses
2. Limits, Computing Limits, End Behavior of Functions
3. Continuity, Continuity of Functions
4. Tangent lines, Rates of Change, The Derivative Function
5. Techniques of Differentiation, The Product and Quotient Rules, The Chain Rule
6. Derivatives of Exponential, Logarithmic and Trigonometric Functions, Derivative of inverse Trigonometric Functions
7. Implicit Differentiation
8. Related Rates
9. L'Hopital's Rule; Indeterminate Forms
10. Analysis of Functions: Increase, Decrease, Concavity
Application: Relative and Absolute Extrema
11. The Indefinite Integral

12. Integration by Substitution
13. The Definition of Area as a Limit; Sigma Notation
14. Integration by Substitution
15. The Definite Integral
16. The Fundamental Theorem of Calculus
17. Evaluating Definite Integrals by Substitution