

Recommended Or Required Reading

1. Thomas' Calculus, 12th Edition, G.B Thomas, M.D.Weir, J.Hass and F.R.Giordano, Addison-Wesley, 2012.
2. Calculus: A Complete Course, Robert A. Adams, C Essex 7th Edition, Addison Wesley Longman Toronto 2010.

Weekly Subjects and Related Preparation Studies

Week	Subjects	Related Preparation
1	Infinite Sequences : Convergence and Divergence of Sequences, Calculating limit of sequences, The Sandwich Theorem for Sequences, The Continuous Function Theorem for Sequences, Commonly Occurring Limits, Recursive Definitions, Bounded Monotonic Sequences, Monotonic Sequences Theorem .	Textbook 1 (Chapter 10)
2	Infinite Series: Geometric Series, The nth-Term Test for a Divergent Series, Combining Series, Adding or Deleting Terms, Convergence Tests For Positive Series: The Integral Test , P-Series , Harmonic Series, The Comparison Test , The Limit Comparison Test , The Ratio Test , The Root Test.	Textbook 1 (Chapter 10)
3	Alternating Series : Alternating Harmonic Series , The Alternating Series Test(Leibniz's Test) , Absolute and Conditional Convergence. Power Series : The Radius of Convergence of a Power Series, Operations on Power Series ,The Series Multiplication Theorem for Power Series , The Term-by-Term Differentiation Theorem , The Term-by Term Integration Theorem,Taylor and Maclaurin Series, Taylor Polynomial of order n.	Textbook 1 (Chapter 10)
4	Applications of Taylor Series: Evaluating non Elementary Integrals, Arctangents, Evaluating Indeterminate Forms. Parametric Equations and Polar Coordinates: Parametrizations of Plane Curves , Parametric Equations , Calculus With Parametric Curves: Derivative,Length of Parametrically Defined Curve.	Textbook 1 (Chapter 10, 11)
5	Polar Coordinates: Polar Equations , Relating Polar and Cartesian Coordinates, Graphing in Polar Coordinates (line, circle, cardioid), Areas and Lengths in Polar Coordinates : Area in the Plane, Length of a Polar Curve.	Textbook 1 (Chapter 11)
6	Vectors: Three-Dimensional Coordinate Systems, Vectors, The Dot Product, Angle Between Two Vectors, Perpendicular Vectors, The Cross Product, Parallel Vectors. Lines and Line Segments in Space: Vectors Equation for a Line, Parametric Equations for a Line, An Equation for a Plane in Space, Lines of Intersection.Vector-Valued Functions:Curves in Space and Their Tangents, Limits and Continuity, Derivatives, Velocity Vector, Acceleration Vector,Differentiation Rules,Arc Length Along a Space Curve.	Textbook 1 (Chapter 12,13)
7	Functions of Several Variables: Domains and Ranges , Functions of Two Variables ,Graphs and Level Curves of Functions of Two Variables,Functions of Three Variables, Level surfaces (plane, sphere, cone, elliptic paraboloid, ellipsoid, cylinder), Limits for Functions of Two Variables, Continuity, Two-Path Test for Nonexistence of a Limit , Continuity of Composites, Functions of More Than Two Variables.	Textbook 1 (Chapter 14)
8	Partial Derivatives: Partial Derivatives of two variables functions, Partial Derivatives and Continuity, Second-Order Partial Derivatives,Partial Derivatives of Still Higher Order, Differentiability,The Chain Rule: Functions of Two Variables , Chain Rule for Functions of two Independent Variables, Functions of Three Variables, Chain Rule for Functions of Three Independent Variables, Chain Rule for Two Independent Variables and Three Intermediate Variables.	Textbook 1 (Chapter 14)
9	Midterm 1	
10	Implicit Differentiation Revisited. Directional Derivatives and Gradient Vectors : Directional Derivatives in the Plane , Interpretation of the Directional Derivative , Calculation and Gradients , Gradients and Tangents to Level Curves , Functions of Three Variables, Tangent	Textbook 1 (Chapter 14)

Planes and Differentials: Tangent Plane of The Surface, The Normal Line of The Surface.

11	The Linearization of a Function of two Variables, Differentials . Extreme Values: Local Extreme Values, First Derivative Test for Local Extreme Values, Critical Point, Saddle Point , Second Derivative Test for Local Extreme Values.	Textbook 1 (Chapter 14)
12	Midterm 2, Double Integrals : Double and Iterated Integrals over Rectangles, Double Integrals as Volumes, Fubini's Theorem (First Form), Double Integrals over General Regions , Double Integrals over Bounded Nonrectangular Regions , Volumes (volumes between two surfaces), Fubini's Theorem (Stronger Form) .	Textbook 1 (Chapter 15)
13	Finding Limits of Integration :Using Vertical Cross-sections , Using Horizontal Cross-sections , Properties of Double Integrals, Area by Double Integration, Average Value Theorem, Double Integrals in Polar Form: Finding Limits of Integration, Changing Cartesian Integrals into Polar Integrals.	Textbook 1 (Chapter 15)
14	Calculating volumes by using polar coordinates (volume between two surfaces), Substitutions in Double Integrals.	Textbook 1 (Chapter 15)
15	Final	