

CALCULUS

Total marks: 100(Theory: 75, Internal Assessment: 25)

5 Periods (4 lectures +1 students' presentation),

(1stWeek)

ε - δ Definition of limit of a function, One sided limit, Limits at infinity, Horizontal asymptotes

Sections 2.3, 2.4[1]

(2ndWeek)

Infinite limits, Vertical asymptotes, Linearization, Differential of a function

Sections 2.5, 3.8 [1]

(3rdWeek)

Concavity, Points of inflection, Curve sketching

Sections 4.4 [1]

(4thWeek)

Indeterminate forms: L'Hôpital's rule, Volumes by slicing, Volumes of solids of revolution by the disk method

Sections 4.6, 6.1(Pages 396 to 402) [1]

(5thWeek)

Volumes of solids of revolution by the washer method, Volume by cylindrical shells, Length of plane curves

Sections 6.1 (Pages 403 to 405), 6.2, 6.3 [1]

(6th Week)

Area of surface of revolution, Improper integration: Type I and II, Tests of convergence and divergence

Sections 6.5 (Pages 436 to 442), 8.8 [1]

(7thWeek)

Polar coordinates, Graphing in polar coordinates

Sections 10.5, 10.6 [1]

(8thWeek)

Vector valued functions: Limit, Continuity, Derivatives, Integrals, Arc length, Unit tangent vector

Sections 13.1, 13.3 [1]

(9thWeek)

Curvature, Unit normal vector, Torsion, Unit binormal vector, Functions of several variables: Graph, Level curves

Sections 13.4, 13.5, 14.1 [1]

(10thWeek)

Limit, Continuity, Partial derivatives, Differentiability

Sections 14.2, 14.3 [1]

(11thWeek)

Chain Rule, Directional derivatives, Gradient

Sections 14.4, 14.5 [1]

(12thWeek)

Tangent plane and normal line, Extreme values, Saddle points

Section 14.6 (Pages 1015 to 1017), 14.7 [1]

REFERENCES:

[1] G. B. Thomas and R. L. Finney, *Calculus*, Pearson Education, 11/e (2012)

SUGGESTED READING:

[2] H. Anton, I. Bivens and S. Davis, *Calculus*, John Wiley and Sons Inc., 7/e (2011)

Note: The emphasis is on learning of methods/techniques of calculus and on the application of these methods for solving variety of problems.