

Differential and Integral Calculus (MATH-205)

Department of Mathematics, College of Science, KSU

Semester I: 1444 (December 04, 2022 – March 02, 2023)

Course Book: Calculus by Earl W. Swokowski et. al. (6th Edition)

Reference Book: Thomas' Calculus Early Transcendentals by Thomas Jr. (13th Edition)

TENTATIVE WEEKLY LECTURE PLAN

Week 1:

Introduction and general information about the course, Definition, forms (or representations), examples, and, convergence and divergence of sequences, Sandwich Theorem for sequences, monotonic, non-monotonic, and bounded sequences, (8.1) Definition and examples of Infinite Series, Convergence of infinite series using sequence of partial sums, (8.2)

Week 2:

Convergence of harmonic and geometric series, n th term test, Miscellaneous results about the convergence and divergence of infinite series (8.2), Positive Terms Infinite Series and Integral Test, Basic and Limit Comparison Tests for convergence of positive-terms infinite series, (8.3)

Week 3:

Ratio and Root Comparison Tests for convergence of positive-terms infinite series (8.4), Alternating Series Test (AST), Absolute and Conditional Convergence of Alternating series (AS), The Ratio Test for Absolute Convergence, (8.5),

Week 4:

Power series and radius of convergence, Power series representation of functions, (8.6-8.7),

Week 5:

Taylor and Maclaurin series, (8.8), Vectors in two and three dimensions, dot and cross products of vectors (10.1-10.4)

Week 6:

Lines and planes, Surfaces, (10.5-10.6)

Week 7:

Vector-valued functions (11.1), limits, derivatives and integrals of vector-valued functions (11.2), Applications of vector-valued functions (velocity, speed, and acceleration) (11.3), Functions of several variables (12.1), Limits and continuity of functions of two and three variables (12.2), partial derivatives (12.3)

Week 8:

The Chain Rules (12.5), Directional derivatives, (12.6), Extrema of functions of several variables (P-I) (12.8)

Week 9:

Extrema of functions of several variables (P-II) (12.8), Lagrange multipliers method for extrema of functions of several variables, (12.9), Double integrals (13.1)

Week 10:

Area using double integrals, Volume using double integrals, (13.2), Double integrals in polar coordinates (13.3)

Week 11:

Surface area using double integrals (13.4)

Weeks 12-13:

Final Examination

****Last updated on *December 2, 2022***