Differential and Integral Calculus (MATH-205)

Department of Mathematics, College of Science, KSU

Semester II: 1444 (March 11, 2023 – June 22, 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, nth 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 6-7:

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Week 8:

Lines and planes, Surfaces (10.5-10.6)

Week 9:

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 10:

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

Week 11:

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 12:

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

Week 13:

Surface area using double integrals (13.4)

Weeks 14-15:

Final Examination

Last updated on $March 8, 2023$