BASIC CALCULUS 1 AND 2

PROF. PARASAR MOHANTY
Department of Mathematics
IIT Kanpur

TYPE OF COURSE: New | Core | UG
COURSE DURATION: 8 weeks (18 Jan’ 21 - 12 Mar’ 21)
EXAM DATE: 21 Mar 2021

PRE-REQUISITES: Grade XII
INTENDED AUDIENCE: 1st year B.Tech, Mathematics Honours

COURSE OUTLINE:
Topics of continuity, differentiability, integrability of a real valued function will be discussed with their applications. Also series representations of some functions will be discussed.

ABOUT INSTRUCTOR:
Prof. Parasar Mohanty is an associate professor in Dept. of Mathematics and Statistics at IIT Kanpur. His area of Specialisation: Harmonic Analysis.

COURSE PLAN:
Week 1: Algebra of Real Numbers, set of Axioms, Completeness, Density, decimal representation of real numbers
Week 2: Convergence of sequences, properties of limit, Sandwich Theorem, Monotonic sequences, Cantor’s completeness Principle, Bolzano-Weierstrass Theorem, Cauchy’s completeness
Week 3: Convergence of series, comparison test, Root test, Ratio test, Power series, Leibniz’s condition
Week 4: Continuity, Intermediate Value theorem, Properties of continuous functions
Week 5: Differentiation, Rolle’s Theorem, Mean Value theorem Higher derivatives Taylor theorem
Week 6: Curve tracing, Applications of derivatives
Week 7: Integrations
Week 8: Applications of Integration