

Stat-225 Real Analysis and Complex Variable

100 Marks: 03 Credits

Number of Class: 35-40

Series: Function and Real Valued Function. Open set, Dense Set, Countability, Compact, Connected sets, Monotonic Class of Sets and Additive Class of Sets. Convergence Principle, Convergence and Absolute Convergence of Series. Comparison Test, Ratio Test, Root test and Integral Test. Rearrangement of Absolute Convergent Series, Cauchy's Convergence, Multiplication of Absolutely Convergent Series.

Real Functions: Continuity, Uniform Continuity, Properties of Continuous Functions, the Exponential, Logarithmic, Trigonometric Functions, Rolle's Theorem, Mean Value Theorems, Cauchy's Mean Value Theorem, Taylor's Theorem with Lagrange's and Cauchy's form of the Remainder.

Riemann Integral: The Existence of the Riemann Integral of a Continuous Function, Simple Properties, First and Second Mean Value Theorem, Convergence and Absolutely Convergence of Improper and Infinite integrals, Sequences and Series of Functions, Uniform convergence, Comparison Test, Term by Term Integration and Differentiation.

Complex Variables: Complex Number, Functions, Limit and Continuity. Complex Differentiation, Cauchy Riemann Equations, Complex Integration, Cauchy's Integral Theorem, Morera's Theorem, Liouville's Theorem, Rouches's Theorem, Taylor's Theorem, Laurant's Theorem, Residue Theorem, Evaluation of Integrals, Elementary Conformal Transformations, and Characteristic Functions.

Text

1. Rudin, W (1976): *Real Analysis*, Academic Press, New York.
2. Spiegel, R.M.: *Complex Variables*.

References

1. Apostol, T. (1992): *Mathematical Analysis*, McGraw Hill, New York.
2. Binmore, G.H. (1965): *Foundation of Analysis*, Books I & II, C.U.P., London
3. Burkill, J.C. (1962): *A First Course in Mathematical Analysis*, C.U.P., London
4. Chowdhury, B: *Elements of Complex Analysis*.
5. Churchill, V.R.: *Complex Variable*.
6. Courant, H. (1988): *Differential and Integral Calculus*, Vol. II & III, Blackie.
7. Goldberger, S.: *Method of Real Analysis*, McGraw Hill, New York.
8. Parzynoski and Zipse (1987): *Introduction to Mathematical Analysis*, McGraw Hill, New York.
9. Spiegel, M. R. (2009): *Schaum's Outline of Complex Variable*, McGraw-Hill/Schaum's Outline.