

Course Title: Advance Mathematics- VI (**Advanced Analysis**)
 Course Rating: 4 Cr. Hours

Advanced Set Theory

- Equivalent Sets
- Countable and Uncountable Sets
- The concept of a cardinal number
- The cardinals \aleph_0 and c
- Addition and multiplication of cardinals
- Cartesian product, Axiom of Choice, Multiplication of cardinal numbers
- Order relation and order types, Well ordered sets, Transfinite induction
- Addition and multiplication of ordinals
- Statements of Zorn's lemma, Maximality principle and their simple implications

Measure Theory

- Outer measure, Lebesgue Measure, Measureable Sets and Lebesgue measure, Non measurable sets, Measureable functions

The Lebesgue Integral

- The Riemann Integral, The Lebesgue integral of a bounded function
- The general Lebesgue integral

General Measure and Integration

- Measure spaces, Measureable functions, Integration, General convergence theorems
- Signed measures, The L_p -spaces, Outer measure and measurability
- The extension theorem
- The Lebesgue Stieltjes integral, Product measures

Evaluation Criteria

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

Recommended Books

1. D. Smith, M. Eggen and R. ST. Andre, *A transition to Advanced Mathematics*, (Brooks Cole, 2004)
2. Seymour Lipschutz, *Set Theory and Related Topics*, (McGraw Hill, 1964)
3. Frankel, A. *Abstract Set theory*, (North Holland Publishing Co., 1961)
4. Royden, H. L. *Real Analysis*, (Prentice Hall, 1988)
5. Suppes, P. *Axiomatic Set Theory*, (Dover Publications Inc., May 1973)
6. Halmos, P. R. *Naive Set Theory*, (Springer, 1974)
7. Halmos, P. R. *Measure Theory*, (Springer, 1974)

8. Rudin, W. *Real and Complex Analysis*, (McGraw-Hill Higher Education, 1987)