Code	Subject Title	Cr. Hrs	Semester
MATH-101	Mathematics A-I [Calculus (I)]	4	I

Year	Discipline
1	Mathematics-I,II, Chemistry-II, Statistics-I,II,III

Preliminaries
- Real numbers and the real line
- Functions and their graphs
- Shifting and scaling graphs
- Solution of equations involving absolute values
- Inequalities
- Complex numbers system. Polar form of complex numbers, De Moivr's theorem
- Circular function, hyperbolic functions, logarithmic

Limit and Continuity
- Limit of a function, left hand and right hand limits, Theorems of limits
- Continuity, Continuous functions

Derivatives and its Applications
- Differentiable functions
- Differentiation of polynomial, rational and transcendental functions
- Mean value theorems and applications
- Higher derivatives, Leibniz's theorem
- L'Hospitals Rule
- Intermediate value theorem, Rolle's theorem
- Taylor's and Maclaurin's theorem with their remainders

Integration and Definite Integrals
- Techniques of evaluating indefinite integrals
- Integration by substitutions, Integration by parts
- Change of variable in indefinite integrals
- Definite integrals, Fundamental theorem of calculus
- Reduction formulas for algebraic and trigonometric integrands
- Improper integrals, Gamma functions

Recommended Books
1. Thomas, *Calculus*, 11th Edition. Addison Wesley Publishing Company, 2005
2. H. Anton, I. Bevens, S. Davis, *Calculus*, 8th Edition, John Wiley & Sons, Inc. 2005
3. Hughes-Hallett, Gleason, McCallum, et al, *Calculus Single and Multivariable*, 3rd Edition. John Wiley & Sons, Inc. 2002.
4. Frank A. Jr, Elliott Mendelson, *Calculus*, Schaum's outlines series, 4th Edition,1999
5. C.H. Edward and E.D Penney, *Calculus and Analytics Geometry*, Prentice Hall, Inc. 1988
6. E. W. Swokowski, *Calculus and Analytic Geometry*, PWS Publishers, Boston, Massachosetts, 1983.