Course Content

Course Code: 18EMAB101	Course Title: Single Variable Calculus	
L-T-P : 4-1-0	Credits: 5	Contact Hrs: 50
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 4		Exam Duration: 3

Content	Hrs
Unit - 1	
Chapter No. 1. Introduction to Mathematical Modeling What is Mathematical modeling, why Mathematical modeling, use of Mathematical modeling,process of mathematical modeling, types of modeling with simple examples.	4 hrs
Chapter No. 2. Functions and Graphs Functions, types of functions, transformations and models (Linear, exponential, trigonometric) **MatLab**: Graphing functions, Domain-Range and interpreting the models.	5 hrs
Chapter No. 3. Calculus of functions and models Limit of a function, Infinite limits- graph, Continuity and discontinuity, Intermediate value theorem statement, Roots of the equation using Bisection Method and Newton- Raphson Method. Interpretation of derivate as a rate of change, All the rules of derivatives (List only), Maxima, Minima, and optimization problems. Curvature and Radius of Curvature, Indeterminate forms, L-Hospital's rule-Examples **MatLab**: Optimization problems. Curvature problems	11hrs
Unit - 2	
Chapter No. 4. Infinite Series Definition, Convergence of series, Tests of convergence – p-series, comparison test, ratio test Representation of a function as a power series, radius of convergence, Taylor's and Maclaurin's series, Applications of Taylor's and Maclaurin's series	06hrs
Chapter No. 5. Integral calculus Tracing of standard curves in Cartesian form ,Parametric form and Polar form; Beta and gamma function, relation between them, evaluation of integrals using Beta and gamma functions; Applications to find arc length, Area, Volume and surface area (Cartesian, parametric and polar curves). Approximate integration- Trapezoidal rule, Simpson's 1/3 rule.	14hrs

Unit - 3	
Chapter No.5 Ordinary differential Equations of first order 1. Introduction to Initial Value problems. Linear and Bernoulli's equations, Exact equations and reducible to exact form. Orthogonal trajectories 2. Applications of first order differential equations-, growth and decay problems, mixture problems, Electrical circuits, Numerical solution to Initial Value problems-Euler's method, Modified Euler's method and Runge-Kutta method Matlab: Solve differential equations	10hrs

Text Books (List of books as mentioned in the approved syllabus)

1. James Stewart, Early Transcendental Calculus, 7ed, Cengage 2010.

References

1. Hughues- Hallett Gleason, Calculus Single and Multivariable, 4ed, Wiley India, 2009.
2. Thomas Calculus, George B Thomas, Pearson India, 12ed, 2010