

Course NO : EM314
Course Title : Numerical Methods
Credits : 3
Prerequisite : Core Courses in Mathematics

Course Content	Time Allocated			
	L	T	P	A
Introduction to Numerical Methods <ul style="list-style-type: none"> Error analysis 	1			
Solutions to Systems of Linear Equations <ul style="list-style-type: none"> Gaussian elimination, UD factorization, Iterative methods, Relaxation methods 	4			
Solutions to Non-Linear Equations <ul style="list-style-type: none"> Fixed point iteration, Newton-Raphson method, System of non-linear equations 	4			
Interpolation <ul style="list-style-type: none"> Lagrange and Newton interpolations, Piecewise and spline interpolations 	4			
Approximation & Curve Fitting <ul style="list-style-type: none"> Taylor series, Least square approximations, Fourier approximation, Uniform (minimax) polynomial approximation, Chebyshev polynomial approximation 	4			
Numerical Calculus <ul style="list-style-type: none"> Differentiation, Interpolation method, Finite difference integration, Newton-Cotes methods, Gaussian integration methods 	5			
Numerical Solutions to Ordinary Differential Equations <ul style="list-style-type: none"> Single step methods ; Taylor method, Runge-kutta methods Multi step methods ; Adams-Bashforth, Adams-Moulton, Predictor corrector methods, Solving system of ordinary differential equations and higher order differential equations Adaptive step size mechanisms 	5			
Numerical Solutions to Partial differential Equations <ul style="list-style-type: none"> Explicit and implicit finite difference methods, Basics of finite element methods 	4			
Total = 31 + 4 + 0.5*20 = 45	31	4		20

Assessment	Percentage Mark	
Continuous Assessment		30
Class Participation	5	
Tutorials	5	
Assignments/ Lab	20	
Written Examinations		70
Mid-Semester	20	
End of Semester	50	

Notation Used :
L - Lectures
T - Tutorials
P - Practical works
A - Assignments