



SUBJECT: Advanced Numerical Methods			
MASTER DEGREE IN MATHEMATICAL ENGINEERING	ECTS: 6	YEAR: 1	QUARTER: 1

WEEK	SESSION	DESCRIPTION OF EACH SESSION	DESCRIPTION	CLASS HOURS
1	1	Polynomial Approximation and Polynomial Interpolation		1.5
1	2	Discussion and Problem Solving		1.5
2	3	Monomial Interpolation. Lagrange Interpolation. Divided Differences. Least Squares. Chebyshev Points.		1.5
2	4	Discussion and Problem Solving		1.5
3	5	Piecewise Interpolation. Cubic Spline Interpolation. Multidimensional Interpolation.		1.5
3	6	Discussion and Problem Solving		1.5
4	7	Numerical Integration: basic methods		1.5
4	8	Discussion and Problem Solving		1.5
5	9	Error Analysis. Peano's Kernel. Gaussian Integration.		1.5
5	10	Discussion and Problem Solving		1.5
6	11	Romberg's Integration. Adaptive Integration.		1.5
6	12	Discussion and Problem Solving		1.5
7	13	Nonlinear Systems: Fixed point iteration.		1.5
7	14	Discussion and Problem Solving		1.5
8	15	Newton's method. Broyden's method. Steepest descent method.		1.5
8	16	Discussion and Problem Solving		1.5
9	17	Initial value ordinary differential equations: Euler's method.		1.5
9	18	Discussion and Problem Solving		1.5



10	19	Runge-Kutta's method.		1.5
10	20	Discussion and Problem Solving		1.5
11	21	Multistep methods.		1.5
11	22	Discussion and Problem Solving		1.5
12	23	Convergence, stability, and consistency.		1.5
12	24	Discussion and Problem Solving		1.5
13	25	Error control and estimation.		1.5
13	26	Discussion and Problem Solving		1.5
14	27	Adaptive methods.		1.5
14	28	Discussion and Problem Solving		1.5