22MYB03 – STATISTICS AND NUMERICAL METHODS
(Common to AGRI, AI&DS,CSE,IT,IOT,CS(Cyber security)CIVIL,CHEMICAL,EEE,MECH Branches)

	L	T	P	C
	3	I	0	4

PRE-REQUISITE : NIL

Course Objective:	• To understand the concept of testing of hypothesis for small and large samples and design of experiments. • To provide adequate knowledge in numerical techniques to solving ordinary differential equations and numerical integration which plays an important role in engineering and technology disciplines.

Course Outcomes The Student will be able to		**Cognitive Level**	**Weightage of COs in End Semester Examination**
CO1	Interpret the principles and techniques in experimental design to solve the variance	Ap	20%
CO2	Apply the fundamental numerical techniques used to solve various types of mathematical problems on solution of equations, interpolation and numerical integration.	Ap	40%
CO3	Determine the statistics based on the data and related to the testing of hypothesis.	An	20%
CO4	Solve the real-world problems using numerical methods for IVPs, demonstrating their applicability and limitations.	Ap	20%
CO5	Demonstrate the importance of interpolation and approximation techniques to solve real-world problems in various disciplines of Engineering using modern tools.	Ap	Internal Assessment

UNIT I - TESTING OF HYPOTHESIS	**(9+3)**
Sampling Distributions-Tests for single mean, difference of means (Large and Small samples) Using z ,t - distribution, F – distribution- Chi-square - Test for independence of attributes and Goodness of fit.	

UNIT II - DESIGN OF EXPERIMENTS	**(9+3)**
Analysis of variance- Completely randomized design - Randomized block design - Latin square design.	

UNIT III - SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	**(9+3)**
Solution of algebraic and transcendental equations - Fixed point iteration method - Newton Raphson method- Solution of linear system of equations Gauss elimination method – Iterative methods of Gauss Jacobi and Gauss Seidel Methods– Eigenvalues of a matrix by Power method .	

UNIT IV - INTERPOLATION AND APPROXIMATION	**(9+3)**
Lagrange's and Newton's divided difference interpolations - Newton's forward and backward difference interpolation - Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules - Romberg's Methods.	

Ratified by Eleventh Academic Council

UNIT V - NUMERICAL DIFFERENTIATION AND INTEGRATION	(9+3)

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

TOTAL (L:45+T:15) : 60 PERIODS

TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
3. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.

Mapping of COs with POs / PSOs														
COs	**POs**												**PSOs**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
1	3													
2	3												2	
3		2											2	2
4	3													2
5	3				2				3			2		2
CO (W.A)	3	2			2				3			2	2	2