Course No. BS-MATH 122   **Title: Engineering Mathematics-II**

Semester: II   (New)   **Credits 3(2+1)**

Syllabus

Teaching Schedule –Theory with weightages (%)

Lecture No.	Topics to be covered	weightage (%)
Differential Equations and its Applications		
1-10	Exact differential equation	35%
	Equations reducible to exact form by Integrating factor	
	Bernoulli's differential equation	
	Equations of the first order and higher degree: Clairaut's form	
	Applications of Differential Equations of first order	
	Linear differential equations with constant coefficients –Rules for finding complementary functions	
	Rules for finding the Particular integral	
	Method of variation of parameters	
	Simultaneous linear differential equations with constant coefficients	
Function of complex variable and its Applications		
11-15	Complex Function, Limit, continuity	10%
	Derivative of complex function	
	Cauchy- Riemann equation with proof	
	Analytic function	
	Harmonic functions	
Infinite Series and its convergence		
16-20	Tests of convergence: Ratio Test	15%
	Raabe's Test, Logarithmic test	
	Alternating series and Leibnitz rule	
	Power series	
	Convergence of exponential series, logarithmic series and binomial series.	
Fourier series		
21-27	Euler's formulae	25%
	Dirichlet's conditions	
	Fourier series in the interval $[0,2\pi]$	
	Fourier series in the interval $[-\pi,\pi]$	
	Fourier series in the interval $[0,2l]$	
	Fourier series in the interval $[-l,l]$	
	Half range series	
Partial differential equations and its Applications		
28-32	Formation of partial differential equations	15%
	Solutions of partial differential equation	
	Lagrange's linear equation	
	Non- linear equation of the first order	

Practical Exercise

1. Differential equations –Exact and Non-Exact
2. Bernoulli's Differential equations
3. Equations of first order and higher degree, Clairaut's equation
4. Applications of differential equations of first order
5. Applications of higher order linear differential equations
6. Applications of Cauchy's and Legendre's linear equations
7. Applications of Simultaneous linear differential equations with constant coefficients.
8. Applications of Functions of a Complex variable
9. Infinite series and its convergence
10. Fourier series in the interval $[0,2\pi], [-\pi, \pi]$,
11. Fourier series in the interval $[0,2l], [-l, l]$,
12. Half range series
13. Harmonic analysis.
14. Solutions of partial differential equations
15. Non-linear partial differential equations
16. Application of partial differential equations: one dimensional wave and heat flow equations, Laplace Equation

Suggested Reading
Text Book
1. Dr. Shinde K. J. *et.al*. A text book of Agricultural Engineering Mathematics-II

Reference Books
1. Narayan Shanti. 2004. A Text Book of Matrices. S. Chand and Co. Ltd. New Delhi.
2. Grewal B S. 2015. Higher Engineering Mathematics. Khanna Publishers Delhi.(43rd Edition)
3. Ramana B V. 2008. Engineering Mathematics. Tata McGraw-Hill. New Delhi.