C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Instrumentation & Control Engineering
SEMESTER: -III
CODE: - 4TE03EMT1
NAME: – Engineering Mathematics – 3 (EMT)

Teaching and Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			Total
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE03EMT1	Engineering Mathematics - 3	4	0	0	4	4	30	1.5	70	3	---	---	---	**100**

Objectives:-

- To represent periodic functions in terms of infinite trigonometric series
- To solve higher order ordinary differential equations
- To solve linear partial differential equations of first and second order
- To learn Laplace transform technique
- To study the numerical methods to solve transcendental equations

Prerequisite:-

Students should have a firm grasp elementary engineering mathematics offered in first and second semesters. The basic concepts of calculus and algebra must be clear.

Course Outline:-

Sr. No.	Course Content	Hours
1	**Fourier Series :** Periodic functions, Dirichlet's conditions, Trigonometric series, Euler's formulae, Fourier expansion of periodic functions with period 2π, Fourier series of even and odd functions, Fourier series of periodic functions with arbitrary periods, half range Fourier series, Harmonic analysis.	**10**
2	**Laplace Transforms and Applications:** Definition of the Laplace transform, Inverse Laplace transform, Linearity property, First Shifting theorem, Laplace Transforms of derivatives and integrals, Differentiation and integration of Laplace transforms, Convolution theorem, Solution of Differential equations using Laplace Transform, Unit step function, Second shifting theorem, Dirac's delta function.	**15**

3	**Ordinary Differential Equations and Applications:** Linear differential equations of second and higher order: Higher order linear differential equations with constant coefficients, Complementary Function (C.F.), Short cut methods for finding Particular Integrals(P.I.), General method: [1/f(D)] r(x) method for finding particular integral, Wronskian, Solution by method of variation of parameters, Cauchy's Homogeneous linear differential equation, Legendre's Homogeneous linear differential equation, Modeling of Electric circuits.	**15**
4	**Partial Differential Equations and Applications:** Formation of PDEs, Solution of Partial Differential equations f(x,y,z,p,q) = 0, Solution of PDE by direct integration, Linear PDEs with constant coefficients, Classification of second order linear PDEs, Applications of PDE: Separation of variables, Solution of Wave equation, Heat equation and Laplace equation.	**15**
5	**Numerical solution of Algebraic & Transcendental equation** Solution of algebraic and transcendental equations: Bisection method, Regula falsi method, Secant method, Newton-Raphson method, rate of convergence	**05**

Learning Outcomes:

After the successful completion of the course, students will be able to

- express physical phenomenon in mathematical form
- represent periodic function as a series in terms of sine and cosine
- Solve differential equations by using tools like Laplace transform and Fourier series.
- To solve second order partial differential equations: wave equation, heat equation, laplace equation.

Teaching & Learning Methodology:

- Lecture method using standard teaching aids.
- Solving term assignments in tutorials.
- Quiz/Seminar/Expert lectures

Books Recommended:

1. Advanced Engineering Mathematics (8th Edition), **E. Kreyszig**, Wiley-India (2007).
2. Higher Engineering Mathematics – Vol. 2, **Dr. K. R. Kachot**, Mahajan Publ. house
3. Engineering Mathematics -Vol 2, by **Baburam**, Pearson.
4. Higher Engineering Mathematics, Thirty-fifth edition. **B. S. Grewal**, Khanna Publication.
5. Elementary Differential Equations (8th Edition), **W. E. Boyce and R. DiPrima**, John Wiley (2005).
6. Fourier series and boundary value problems, **R. V. Churchill and J. W. Brown**, McGraw-Hill (7th Edition - 2006).
7. Numerical Methods, by **B. S. Grewal**, Khanna Publ.

E-Resources:

1 http://www.wiley.com/college/mat/kreyszig154962/
2 http://en.wikipedia.org/wiki/Portal:Mathematics
3 http://www.online.math.uh.edu

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