ME 501 Advanced Engineering Mathematics (3-0-0-6)

Linear Algebra: Introduction to vector space, linear independence, solution of simultaneous linear systems, uniqueness and existence, Algebraic eigenvalue problem, similarity transformation, Introduction of linear transformation, Gram-Schmidt orthonormalization

Multivariate Calculus: Differential geometry, parametric representation, Frenet-Serret frame, directional derivative, Grad, Div and Curl, introduction to tensor algebra, equation of line, plane, surface, Line integral, path independence, Divergence theorem, Stokes' theorem, Green's theorem in a plane

Ordinary Differential Equation: First order equations, integrating factor, orthogonal trajectories, Existence and uniqueness, Second order equations with constant coefficients, The Cauchy-Euler equation, Method of undetermined coefficients, variation of parameters,matrix method, Sturm-Liouville problems, trigonometric Fourier series

Integral Transform: Fourier series, Fourier integral, Fourier and Laplace transform, standard rules, Dirac-delta and Heaviside function, convolution, solution of ODEs

Partial differential equation: Linear equations, superposition, separation of variable, Second order wave equation, Unsteady heat conduction equation, Laplace equation

Probability and Statistics: Probability Distribution, Bayes Theorem, Parameter Estimation, Testing of Hypothesis, Goodness of Fit

Texts/References

1. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley, 10th edition, 2011.
2. R. K. Jain and S.R.K Iyengar, Advanced Engineering Mathematics, Narosa Publishing House, 5th edition, 2016.
3. Gilbert Strang, Linear Algebra, Cengage learning, 4th edition, 2006.
4. Shepley L. Ross, Differential Equations, Wiley, 4th edition, 1989.
5. David Poole, Linear Algebra A Modern Introduction, Thomson, 4th edition, 2019.
6. Thomas and Finney, Calculus and Analytic Geometry, Narosa Publishing House, 2010.
7. Georgi P. Tolstov, Fourier Series, Dover Publications, Inc, 2012.
8. Ronald N. Bracewell, The Fourier Transform and its Applications, McGrawHill, 2004.
9. Michael Greenberg, Advanced Engineering Mathematics, 2nd edition, Pearson,