

Department of Mathematical and Computational Sciences
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Course Details and Evaluation Plan

Course Code	: MA713
Course Title	: Mathematical Methods for Engineers
L-T-P	: 3-0-0
Credits	: 3
Course Instructor	: Dr. P. Sam Johnson
Teaching Department	: Mathematical and Computational Sciences (MACS)
Evaluation Plan	: Weightage of Mid-sem is 25 % Weightage of End-sem is 50 % Weightage of Quizzes and Classroom Activities is 25 %

Course Contents

- Revision of Linear Algebra: Vector spaces, Linear independence, Bases, Linear Transformations, Range and Kernel, Isomorphism, Matrix of transformations and change of basis.
- Partial Differential Equations: Second order PDEs, Classifications, Formulation and method of solutions of Wave equation, Heat equation and Laplace equation.
- Tensor Calculus: Line, area and volume integrals, Spaces of N-dimensions, coordinate transformations, covariant and mixed tensors, fundamental operation with tensors, the line element and metric tensor, conjugate tensor, Christoffels symbols, covariant derivative.

References

1. G. Hadley, "Linear Algebra", Narosa, 2002.
2. A. N. Kolmogorov and S. V. Fomin, "Elements of the Theory of Functions and Functional Analysis", 2001.
3. Sokolnikoff and Redheffer, "Mathematics of Physics and Engineering", 2nd edition, McGraw Hill, 2006.
4. S. Sokolnikoff, "Tensor Analysis", Wiley, New York, 2006.
5. R. Marsden and Abraham, "Manifolds, Tensor Analysis, and Applications", Springer, 2001.
6. J. L. Synge, Tensor Calculus, Dover Publications (July 1, 1978).
7. L.A. Pipes, L.R. Harwill: Applied Mathematics for Engineers and Physicists, McGraw Hill, 2004.