**MA\*728 Finite Element Method**

Basic concept of the finite element method, Integral formulations and variational methods, The Lax-Milgram theorem, The abstract Galerkin method, Piecewise polynomial approximation in Sobolev spaces, Finite elements, Numerical quadrature, Applications to autonomous and non-autonomous problems, Optical error bounds in energy norms, Variational crimes, Apriori error estimates. A posteriori error analysis, reliability, efficiency and adaptivity.

**References:**

1. C. Johnson, Numerical Solution of Partial Differential Equations by the Finite Element Method, Dover Publications, 2009.
2. P. G. Ciarlet, The Finite Element Method for Elliptic Problems, North-Holland, 1978.
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4. S. C. Brenner and L. R. Scott, The Mathematical Theory of Finite Element Methods, 2nd edition, Springer, 2002.
5. Z. Chen, Finite Element Methods and Their Applications, Springer, 2005.
6. D. L. Logan, A First Course in the Finite Element Method, 4th edition, Cenegage Learning India Pvt Ltd, 2007.
7. A. J. Davies, The Finite Element Method: An Introduction with Partial Differential Equations, Oxford University Press, 2011.