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Finite Element Analysis

Course Information

by

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Course Synopsis

- This course will expose to students various techniques in analysing common structures using stiffness methods, truss equations and beam equations.
- Students are taught how to analyse frame structures using frame and grid equations.
- Finite element analysis procedures such as plane stress, plane strain stiffness equations and linear-strain triangle equations will be discussed.
- Axisymmetric elements and isoparametric formulations are second last topic for this course.
- Towards the end, students will learn various ways in analysing three-dimensional stress and use finite elements software - ANSYS to solve structural engineering problems.



Course Outcomes

1. Analyse complex engineering structures using truss, beam, plane stress and plane strain equations for static and dynamic structural analysis, heat transfer, fluid flow and electrostatic analysis
2. Apply finite element techniques to perform simulations of structures subjected to static and dynamic loading, heat transfer, and fluid flow through porous media
3. Analyse complex engineering structures using Finite Element Software
4. Develop finite element formulations as well as solution algorithms for various types of analyses, structural elements and materials



Recommended Reading

1. Daryl L. Logan. A First Course in The Finite Element Method, Global Engineering Publisher, 2012, ISBN-13:978-0-495-66827-5, ISBN-10:0-495-66827-3
2. Manuals of Exercises and Workbooks accompanying CIVILFEM software: General Finite Element modules, 2013
3. J.N. Reddy – An Introduction to the finite element method – Tata McGraw Hill Publishing Co. Ltd, 2010
4. C.S. Krishnamoorthy, Finite Element Analysis – Theory & Programming, Tata McGraw Hill Publishing Co. Ltd, 2012
5. Zienkiewicz & Taylor, The Finite Element Method, 4th Edition, Vol. I & II, McGraw Hill International Edition, 2013
6. G.R. Buchanan, Finite Element Analysis Schaum's outlines, Tata McGraw Hill Publishing Co. Ltd, 2011
7. S.S. Rao, The Finite Element Method in Engineering, 4th Edition, ELSEVIER Publiation, 2010
8. Robert D. Cook, D.S. Malkus, M.E. Plesha, Concepts & Applications of Finite Element Analysis, John Wiley & Sons, 2011
9. Segerlind L.J., Applied Finite Element Analysis, John Wiley & Sons, 2012



Author Information

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