



MATRIX METHOD OF STRUCTURAL ANALYSIS

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INTENDED AUDIENCE : Civil Engineering, Mechanical Engineering, Aerospace Engineering, Naval Architecture,
Applied Mechanics

PRE-REQUISITES : Solid Mechanics, Structural Analysis 1

INDUSTRIES APPLICABLE TO : Any Civil, Mechanical and Aerospace company

COURSE OUTLINE :

This is a second level course on structural analysis. Herein the concept of matrix method of structural analysis with application in various structural components will be discussed. This course will serve as a bridge between structural analysis 1 (the first course on structural analysis) and more advance topic such as finite element method (FEM).

ABOUT INSTRUCTOR :

Prof. Amit Shaw is presently an Associate Professor in the Department of Civil Engineering, IIT Kharagpur. He obtained his Bachelor's degree in Civil Engineering from IEST Shibpur (formerly Bengal Engineering College Shibpur) in 2000, MTech in Structures from IIT Roorkee in 2003 and PhD in Computational Mechanics from IISc Bangalore in 2007. Prior to joining IIT Kharagpur, Professor Shaw spent two years as Research Fellow in University of Aberdeen, UK. He also worked for some time in industries like Gammon India Limited and L&T ECC.

Prof. Biswanath Banerjee is presently an Assistant Professor in the Department of Civil Engineering, IIT Kharagpur. He obtained his Bachelors degree in Construction Engineering from Jadavpur University in 2000, MTech in Structures from IIT Kharagpur in 2004 and PhD in Computational Mechanics from IISc Bangalore in 2009. Prior to joining IIT Kharagpur, Professor Banerjee spent two years as Post-doctoral Research Fellow in Cornell University, USA. He has also spent for some time in industries like Gammon India Limited, TRF Limited (A Tata enterprise) and Research labs in SERC Chennai (A CSIR Unit) as a Scientist. Professor Banerjees research area is in the field of Computational Mechanics and Reverse Engineering Problems.

COURSE PLAN :

Week 01 : Introduction Structures, loads and response, determinate and indeterminate structures, stiffness and flexibility

Week 02 : Review of analysis of Indeterminate structures: Force and displacement methods

Week 03 : Mathematical preliminaries, Review of concept of matrix algebra; stiffness and flexibility matrices

Week 04 : Analysis of Trusses

Week 05 : Analysis of Beams

Week 06 : Analysis of plane frames

Week 07 : Implementation issues

Week 08 : Beyond matrix method: Introduction to finite element method