Relevant course:

Matrix Stiffness Method

Relevant department:

Civil Engineering

Pre requisite:

Engineering Mechanics, Strength of Materials, Structural Analysis (general course- bending moment and shear forces, deflections of statically determinate and indeterminate structures, strain energy etc.)

Course outline:

Day 1:

(1) Definition and explanation of static and kinematic indeterminacy, force (flexibility) and displacement (stiffness) methods

(2) Analysis of plane Trusses using stiffness approach- displacement and force transformation matrices- element and global stiffness matrices- member forces- stiffness matrix for space truss- thermal and fabrication error

Day 2:

(3) Analysis of Continuous Beams- element and global stiffness matrices- intermediate loading- sinking of supports

(4) Analysis of pin-jointed plane frames and rigid space frames – preliminary discussions.

Day 3:

(5) Preliminaries to more complicated issues- oblique supports- virtual work principles- relations to finite element analysis- non-linear analysis of framed structures (only nominal discussion and introduction for future self study)