



Advanced Structural Analysis

SWAYAM Prabha Course Code – C20

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DEPARTMENT	Civil Department
INSTITUTE	Indian Institute of Technology, Madras
Course Outline	<p>This course mainly deals with matrix analysis of structures.</p> <p>It begins with a review of the basic concepts of structural analysis and matrix algebra, and shows how the latter provides an excellent mathematical framework for the former.</p> <p>This is followed by detailed descriptions, and demonstrations through many examples, of how matrix methods can be applied to linear static analysis of skeletal structures (plane and space trusses; beams and grids; plane and space frames) by the stiffness method, and also the flexibility method.</p> <p>Also, it is shown how simple structures can be conveniently solved using a reduced stiffness formulation, involving far less computational effort.</p> <p>Finally, the analysis of elastic instability and second-order response is discussed.</p> <p>The main objective is to enable the student to have a good grasp of all the fundamental issues in these advanced topics in structural analysis, besides enjoying the learning process, and developing analytical and intuitive skills.</p> <p>This course is also expected to enable a good understanding of how standard software packages (routinely used for frame analysis in design offices) operate.</p> <p>Moreover, the student will be well prepared to explore and understand further topics like Finite Element Analysis.</p>

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1	L1	Lecture - 1 Review of Basic Structural Analysis I
2	L2	Lecture - 2 Review of Basic Structural Analysis I
3	L3	Lecture - 3 Review of Basic Structural Analysis I

4	L4	Lecture - 4 Review of Basic Structural Analysis I
5	L5	Lecture -5 Review of Basic Structural Analysis I
6	L6	Lecture- 6 Review of Basic Structural Analysis I
7	L7	Lecture - 7 Review of Basic Structural Analysis II
8	L8	Lecture - 8 Review of Basic Structural Analysis II
9	L9	Lecture - 9 Review of Basic Structural Analysis II
10	L10	Lecture - 10 Review of Basic Structural Analysis II
11	L11	Lecture - 11 Review of Basic Structural Analysis II
12	L12	Lecture - 12 Review of Basic Structural Analysis II
13	L13	Lecture - 13 Review of Basic Structural Analysis II
14	L14	Lecture - 14 Review of Basic Structural Analysis II
15	L15	Lecture - 15 Review of Basic Structural Analysis II
16	L16	Lecture - 16 Review of Basic Structural Analysis II
17	L17	Lecture - 17 Basic Matrix Concepts
18	L18	Lecture - 18 Basic Matrix Concepts
19	L19	Lecture - 19 Basic Matrix Concepts
20	L20	Lecture - 20 Basic Matrix Concepts
21	L21	Lecture - 21 Basic Matrix Concepts
22	L22	Lecture - 22 Matrix Analysis of Structures with Axial Elements
23	L23	Lecture - 23 Matrix Analysis of Structures with Axial Elements
24	L24	Lecture - 24 Matrix Analysis of Structures with Axial Elements
25	L25	Lecture - 25 Matrix Analysis of Structures with Axial Elements
26	L26	Lecture - 26 Matrix Analysis of Structures with Axial Elements

27	L27	Lecture - 27 Matrix Analysis of Beams and Grids
28	L28	Lecture - 28 Matrix Analysis of Beams and Grids
29	L29	Lecture - 29 Matrix Analysis of Beams and Grids
30	L30	Lecture - 30 Matrix Analysis of Beams and Grids
31	L31	Lecture - 31 Matrix Analysis of Beams and Grids
32	L32	Lecture - 32 Matrix Analysis of Beams and Grids
33	L33	Lecture - 33 Matrix Analysis of Plane and Space Frames
34	L34	Lecture - 34 Matrix Analysis of Plane and Space Frames
35	L35	Lecture - 35 Matrix Analysis of Plane and Space Frames
36	L36	Lecture - 36 Matrix Analysis of Plane and Space Frames
37	L37	Lecture - 37 Matrix Analysis of Plane and Space Frames
38	L38	Lecture - 38 Analysis of elastic instability and second-order effects
39	L39	Lecture - 39 Analysis of elastic instability and second-order effects
40	L40	Lecture - 40 Analysis of elastic instability and second-order effects
41	L41	Lecture - 41 Life beyond Structures & Analysis

References if Any: