

PROFESSOR'S NAME	Prof.Anirvan Dasgupta
DEPARTMENT	Department of Mechanical Engineering
INSTITUTE	Indian Institute of Technology Kharagpur
COURSE OUTLINE	<p>Vibrations of strings and bars: equations of motion, modal analysis, approximate methods, initial value problem, forced vibrations, damped vibrations.</p> <p>Wave propagation and scattering: d'Alembert solution, harmonic waves, scattering, applications of wave solution.</p> <p>Vibrations of beams: equation of motion, modal analysis, approximate methods, initial value problem, forced vibrations, special problems, wave propagation.</p> <p>Vibrations of membranes: equations of motion, modal analysis, approximate methods.</p> <p>Vibrations of plates: equations of motion, modal analysis, approximate methods.</p>

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	Module1_L1	Transverse Vibrations of Strings - I
2.	Module1_L2	Transverse Vibrations of Strings - II
3.	Module1_L3	Axial and Torsional Vibrations of Bars
4.	Module1_L4	Variational Formulation - I
5.	Module1_L5	Variational Formulation - II
6.	Module1_L6	Modal Analysis - I
7.	Module1_L7	Modal Analysis - II
8.	Module1_L8	Properties of the Eigenvalue Problem
9.	Module1_L9	Modal Analysis: Approximate Methods - I

10.	Module1_L10	Modal Analysis: Approximate Methods - II
11.	Module1_L11	Initial Value Problem
12.	Module1_L12	Forced Vibration Analysis - I
13.	Module1_L13	Forced Vibration Analysis - II
14.	Module1_L14	Forced Vibration Analysis - III
15.	Module1_L15	Damping in Structures
16.	Module1_L16	Axially Translating Strings
17.	Module2_L17	d' Alembert's Solution - I
18.	Module2_L18	d' Alembert's Solution - II
19.	Module2_L19	Harmonic Waves and Energetics of Wave Motion
20.	Module2_L20	Scattering of Waves
21.	Module2_L21	Applications of Wave Solution - I
22.	Module2_L22	Applications of Wave Solution - II
23.	Module3_L23	Beam Models - I
24.	Module3_L24	Beam Models - II
25.	Module3_L25	Modal Analysis of Beams
26.	Module3_L26	Applications of Modal Solution
27.	Module3_L27	Approximate Methods
28.	Module3_L28	Topic in Beam Vibration - I
29.	Module3_L29	Topic in Beam Vibration - II
30.	Module3_L30	Wave Propagation in Beams
31.	Module3_L31	Dynamics of Curved Beams
32.	Module3_L32	Vibrations of Rings and Arches
33.	Module4_L33	Dynamics of Membranes
34.	Module4_L34	Vibrations of Rectangular Membrane
35.	Module4_L35	Vibrations of Circular Membrane
36.	Module4_L36	Special Problems in Membrane Vibrations
37.	Module5_L37	Dynamics of Plates

38.	Module5_L38	Vibrations of Rectangular Plates
39.	Module5_L39	Vibrations of Circular Plates
40.	Module5_L40	Special Problems in Plate Vibrations

List of reference material/ books:

Peter Hagedorn and Anirvan DasGupta : Vibrations and Waves in Continuous Mechanical Systems, Wiley, 2007.

Leonard Meirovitch : Analytical Methods in Vibrations, The Macmillan Co., 1967.

S.S. Rao:Vibration of Continuous Systems, Wiley, 2007.

Name and contact details of two referees for the course: