Dynamics of Structures

Syllabus

1-Introduction
Stages of dynamic analysis, degrees of freedom, solution of equations of motion, damping in structures, mechanical characteristics of springs.

2-Free Undamped Single degree of freedom systems
Solution of the differential equation of motion, natural period and frequency, amplitude of vibration, torsional vibration.

3- Free damped single degree of freedom systems
Vibration with viscous damping, critical damping, underdamped systems, logarithmic decrement

4- Forced vibration
Undamped harmonic excitation, resonance, response ratio, damped harmonic excitation

5- Response to support motion

6- Force transmitted to the foundation

7- Response to general dynamic loading
Dehumel's integral, response to rectangular and triangular loads

8- Systems with more than one degree of freedom
Two degrees of freedom systems, multi degrees of freedom systems, normal modes, natural frequencies, characteristic shapes, orthgonality.

9- Stadola- Vianello procedure for frequencies and characteristic shape

10- Modified Rayliegh method

11- Modal analysis

12- structures with distributed mass and loads.