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**STRUCTURAL DYNAMICS**

Course Code: 13CE 2203

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**4 0 3****Course Educational Objectives:**

1. To create a understanding on application of single degree and multi-degree freedom systems.
2. To impart the knowledge on calculation of mode superposition

**Course Outcomes:**

1. Students acquire the ability to analyze multi-degrees of freedom system for structures.
2. The student will demonstrate the ability to analyze the structures for dynamic effects.
3. To impart the students, with the knowledge of Single degree of freedom system
4. Single degree of freedom system: Natural Vibration, time period, amplitude, various forcing functions, Response to undamped & damped system.

**UNIT – I**

**Single degree of freedom system:** Natural Vibration, time period, amplitude, various force functions, Response to undamped & damped system.

**UNIT – II**

**Single degree of freedom system:** Forced vibration, Response to damped & undamped, Response to pulsating force, Support motion (Transmissibility).

**UNIT – III**

**Single degree of freedom system:** Coloumb damping, Viscous damped for harmonic vibration & frequency response curve.

**UNIT – IV**

**Multi degree freedom system:** Determination of natural frequency, characteristic shapes for undamped system, orthogonality of natural modes and normal coordinates.

**UNIT – V**

**Methods of combining modes:** Mode superposition method, Modal truncation errors-Modal Acceleration method, Direct Integration methods, Explicit and Implicit methods.

**TEXT BOOKS:**

1. Chopra A. K., “*Dynamics of Structures*”, 3<sup>rd</sup> Edition, Pearson edition, 2007.
2. Mario Paz, William Leigh., “*Structural Dynamics: Theory and Computation*”, 5<sup>th</sup> edition, Springer. 2003.

**REFERENCES:**

1. Raymond W. Clough, Joseph Penzien , “*Dynamics of Structures*”, Mc Graw-Hill Book Company.
2. W. Weaver, Jr., S. P. Timoshenko, D. H. Young. “*Vibration Problems in Engineering*” , 4<sup>th</sup> Edition. 2010.

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