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| 1.  | Title of the course   | Structural Dynamics                               |
| 2.  | Course number   | CE503L  |
| 3.  | Structure of credits  | 3-0-0-3   |
| 4.  | Offered to  | PG  |
| 5.  | New course/modification to  | Modification To CE5102/2                          |
| 6.  | To be offered by  | Department of Civil and Environmental Engineering |
| 7.  | To take effect from   | July 2022   |
| 8.  | Prerequisite  | CoT   |
| 9.  | <b>Course Objective(s):</b> 1. Formulating equations of motion and solving for response under periodic and aperiodic loading in linear systems. 2. Developing conceptual understanding of natural frequency, mode shapes, resonance and modal analysis. 3. Learning approximate methods of vibration analysis and also response analysis to earthquake and moving loads.  |   |
| 10. | <b>Course Content:</b> Introduction - degrees of freedom, energy storage elements – mass, spring and damper, equations of motion ; Single degree of freedom system (SDOF/sdof) - undamped and damped, free and forced vibration analysis – natural frequency, critical damping, transient and steady state, resonance, Duhamel's integral; Multiple degrees of freedom system (MDOF/mdof) - modal analysis and orthogonality conditions; Continuous systems (distributed parameter systems); Approximate methods - Rayleigh's quotient, Rayleigh-Ritz method; Applications - earthquake engineering, random vibration |   |
| 11. | <b>Textbook(s):</b><br>1. R W Clough and J Penzien, <i>Dynamics of structures</i> , McGraw-Hill, NY (1993).<br>2. A K Chopra, <i>Dynamics of structures</i> , Prentice Hall India, New Delhi (1995).  |   |
| 12. | <b>Reference(s):</b><br>1. L Meirovich, <i>Elements of vibration analysis</i> , McGraw-Hill, NY (1984).<br>2. M Paz, <i>Structural dynamics</i> , CBS Publishers, New Delhi. (1984).<br>3. L Meirovich, <i>Principles and techniques of vibrations</i> , , Prentice Hall, NJ (1997).<br>4. L Meirovich, <i>Analytical methods in vibrations</i> , Macmillan, NY (1967).   |   |