

**INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI**  
**PROFORMA FOR NEW COURSE**

1.	Title of the Course	Structural Dynamics
2.	Course Number	CE5102
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered to	PG
6.	New Course/ Modification to	New Course
7.	To be offered by	Dr. B. Radhika Dept. of Civil Engineering
8.	To take effect from	January 2018
9.	Prerequisite	COT
10.	Whether approved by the Program	Yes
11.	<p>Course Objectives: (Max 70 words)</p> <ol style="list-style-type: none"> <li>1. Formulating equations of motion and solving for response under periodic and aperiodic loading in linear systems.</li> <li>2. Developing conceptual understanding of natural frequency, mode shapes, resonance and modal analysis.</li> <li>3. Learning approximate methods of vibration analysis and also response analysis to earthquake and moving loads.</li> </ol>	
12.	<p>Course Content: (Max 100 words):</p> <p>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, Duhanmel’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</p>	
13.	<p>Text Book:</p> <ul style="list-style-type: none"> <li>• R W Clough and J Penzien, 1993, <i>Dynamics of structures</i>, McGraw-Hill, NY</li> <li>• A K Chopra, 1995, <i>Dynamics of structures</i>, Prentice Hall India, New Delhi.</li> </ul>	
14.	<p>References:</p> <ul style="list-style-type: none"> <li>• L Meirovich, 1984, <i>Elements of vibration analysis</i>, McGraw-Hill, NY</li> <li>• M Paz, 1984, <i>Structural dynamics</i>, CBS Publishers, New Delhi.</li> <li>• L Meirovich, 1997, <i>Principles and techniques of vibrations</i>, Prentice Hall, NJ.</li> <li>• L Meirovich, 1967, <i>Analytical methods in vibrations</i>, Macmillan, NY.</li> <li>• W T Thompson, 1983, <i>Theory of vibrations</i>, Prentice hall, New Delhi</li> <li>• C W de Silva, 1999, <i>Vibration: fundamentals and practice</i>, CRC Press, Boca Raton.</li> <li>• S S Rao, 2004, <i>Mechanical Vibrations</i>, 4<sup>th</sup> Edition, Pearson Education, New Delhi.</li> <li>• Y K Lin, 1967, <i>Probabilistic theory of structural dynamics</i>, Mc-GrawHill.</li> <li>• N C Nigam, 1983, <i>Introduction to random vibrations</i>, The MIT press, Massachussets.</li> </ul>	