

Course Outline:

1. **Introduction:** Why we study vibration?; Kinematics of vibrations
2. **Introduction to Modeling:** Mechanical modeling; Mechanical elements; Continuous system elements
3. **Single Degree of Freedom System:** Undamped free vibration; Damped free vibration: Viscous damping; Columb damping; Hysterisis damping (optional)
4. **Forced Vibration of Single Degree of Freedom System:** Mechanical models and equations of motion; General solution of the equation of motion; Application of SDOF system
5. **Two Degree of Freedom System:** Free undamped vibration; Free vibration with damping; Forced vibration
6. **Multi-Degree of Freedom System:** Generalized coordinates; Derivation of the equations of motion; Free undamped vibration; Forced vibration; Approximate methods: Rayleigh method, Dunkerly's method, Holzer's method, Matrix iteration method(Optional), Jacobi's method (optional)
7. **Whirling of Shafts**
8. **Torsional Vibration**

Causes of Vibration and Control: Causes of vibration; Vibration control