

## ME 820 Mechanical Vibrations and Shock: Theory & Measurements

**Characteristics of vibration & shock:** Periodic vibration-Stationary random vibration-Transient phenomena and shocks-Non Stationary random vibrations

**Response of mechanical system due to vibration:** Response of linear and non linear system for vibrations-rotational & torsional vibrations-Response of mechanical system due to random vibration-Shock response & shock spectra-Vibration in structures- Shock and vibration analysis using FEA-Statistical energy analysis

**Effects of vibration and shock on mechanical system:** Damaging effects of vibration-Damaging effects of shock & transients

**Effects of vibration and shock on man:** Whole body vibration-Hand & arm vibration

**Vibration measuring instrumentation and techniques:** General measurement consideration-Selection of accelerometer-Selection of accelerometer pre amplifier-Calibration & system perfectness check-Force & impedance transducers-Mounting of accelerometers-Lab oriented instrumentation

**Frequency analysis of vibration and shock:** Introduction- Serial analysis of stationary signals-Real time analysis of transient and stationary signals-Analysis of non stationary signals

**Vibration measurement for machine health monitoring:** Basic consideration- Force vibration relationships-Frequency range, dynamic range parameters-Use of vibration measurements for maintenance

**Vibration and shock testing:** Vibration testing-Shock testing

**Fundamentals of shock and vibration control:** Isolation of vibration and shock-Dynamic vibration control- Vibration damping.

**Structural testing**

**Vibration of continuous systems**

**References:**

1. Jens Trample Broch, *Mechanical Vibration and Shock Measurements*, Bruel &Kjaer, Denmark, 2<sup>nd</sup> Edison, 1984
2. Ole Dossing, *Structural Testing Part I & Part II*, Bruel &Kjaer, Denmark, 1988z

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