EXPERIMENTAL STRESS ANALYSIS

Course Code: 15ME2207

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Course Outcomes:

At the end of the course, the student will be able to

CO1: explain the measurement of strain under static and dynamic loads.

CO2: describe the Mechanical, optical, pneumatic and electrical strain gauges for strain measurement.

CO3: create awareness about the fixing of gauges and temperature effects in bonded gauges and measure of stress in stress gauges.

CO4: analysis of measuring circuits and strains of different strain gauge rosettes.

CO5: describe the measurements by using transducers and exciters.

UNIT-I (10-Lectures)

Strain measurement, ideal strain gauge, mechanical, optical, acoustical, pneumatic, dielectric and electrical strain gauges, differential transformer and piezoelectric transducers.

UNIT-II (10-Lectures)

Electrical wire resistance strain gauges: bonded type gauges, bonding agents, foil gauges, gauge materials, weldable gauges.

UNIT-III (10-Lectures)

Strain gauge- adhesive, fixing of gauges, temperature effects in bonded gauges, gauge factor and gauge sensitivity, measurement of stress, stress gauge.

UNIT-IV (10-Lectures)

Measuring circuits and strain gauge rosette: potentiometer circuit, Wheatstone bridge, circuit sensitivity and output, temperature

compensation and signal addition, rectangular, delta and tee- delta rosette, applications of strain gauge in practical problems.

UNIT-V (10-Lectures)

Vibration measurement: Introduction, transducers, vibration pickups, frequency measuring instruments, vibration exciters, signal analysis.

TEXT BOOK:

JW Dally and WF Riley, "*Experimental Stress Analysis*", McGraw-Hill Publications, 2003

REFERENCES:

1. CC Perry and HR Lissner, "*The Strain Gage Primer*", McGraw-Hill, 2000.
2. Abdul Mubeen, "*Experimental Stress Analysis*", DhanpatRai and Sons, 2001.
3. PS Theocaris, "Moire Fringes in Strain Analysis", Pergammon Press, 2002.