AKU B.E./B.Tech MECH Sem 4 syllabus

Instrumentation & Control

Module: 1
Measurement systems and performance -the configuration of a measuring system, Methods for correction for interfering and modifying inputs– accuracy, range, resolution, error sources, precision, error sensitivity etc.Classification of errors and statistical analysis of experimental data.

Module: 2 Instrumentation system elements -sensors for common engineering measurements. Transducers based on variable resistance, variable induction, variable capacitance and piezo-electric effects, Displacement transducer.
Module: 3 Signal processing and conditioning; correction elements-actuators: pneumatic, hydraulic, electric.

Module:4
Control systems – basic elements, open/closed loop, design of block diagram; control method – P, PI, PID, when to choose what, tuning of controllers.

Module:5 System models, transfer function and system response, frequency response; Nyquist diagrams and
their use.

Strength of Materials

PCC-ME 205 Strength of Materials

4.5 credits

Module :1

Deformation in solids- Hooke’s law, stress and strain- tension,

compression and shear stresses- elastic constants and their relations- volumetric, linear and shear strains- principal stresses and principal planes- Mohr's circle, theories of failure,

Module :2
Beams and types transverse loading on beams- shear force and bend moment diagrams- Types of beam supports, simply supported and over-hanging beams, cantilevers. Theory of bending of beams, bending stress distribution and neutral axis, shear stress distribution, point and distributed loads.

Module :3
Moment of inertia about an axis and polar moment of inertia, deflection of a beam using double integration method, computation of slopes and deflection in beams, Maxwell's reciprocal theorems.

Module :4
Torsion, stresses and deformation in circular and hollow shafts, stepped shafts, deflection of shafts fixed at both ends, stresses and deflection of helical springs.

Module :5
Axial and hoop stresses in cylinders subjected to internal pressure, deformation of thick and thin cylinders, deformation in spherical shells subjected to internal pressure.

Text Books:
1. Egor P. Popov, Engineering Mechanics of Solids, Prentice Hall of India, New Delhi,2001.
2. R. Subramanian, Strength of Materials, Oxford University Press,2007.
3. Ferdinand P. Been, Russel Johnson Jr. and John J. Dewole, Mechanics of Materials, Tata
GrawHill Publishing Co. Ltd., New Delhi2005.