

KL University
Department of Electronics & Computer Engineering
M.Tech (WCSN) First Semester 2015-2017

Course Code : 15-EM5111
Course Title : Sensors and Sensing Principles
Course Structure : 3-2-0
Credits : 4

SYLLABUS:

Unit-1.Sensor Fundamentals:

Basic sensor technology -sensor characteristics –static and dynamic –Principles of sensing-capacitance- magnetic and electromagnetic induction –resistance – piezoelectric effect – Pyroelectric effect -Hall effect- See beck and Pettier effect-heat transfer-light.

Unit2 Physical sensors:

Position, Displacement and Level sensors, Velocity and Acceleration sensors, Force, Strain, Tactile and pressure sensors.

Unit-3. Chemical sensors:

Classification of chemical sensing Mechanism, Potentiometric sensors, Conduct metric Sensors, Amperometric Sensors, Enhanced Catalytic gas Sensors.

Unit-4 Optical Sensors:

Optical Radiation- Electromagnetic Spectrum, Snell's Law and Total internal reflection, Diffraction principles, Optical Detectors and Sources-Photo diodes and transistors, Photo-darling ton pairs, Photoconductive sensors, CCD sensors, Fiber optic sensors. Solid state light sources- LED , Diode lasers, Semiconductor laser optical cavity resonator.

Unit-5. Bio sensors

Origin and Transmission of bioelectrical Signals, The Electromyogram (EMG) & the Electrocardiogram (ECG) The Electroencephalogram (EEG) & Blood pressure measurement, Catalytic biosensors, mono-enzyme electrodes, bi-enzyme electrodes. cell based biosensors, biochips and biosensor arrays, problems and limitations.

Text books:

1. Biosensor Principles and Applications, Edited by Loïc J.Blum, Pierre R. Coulet Agarwal, Govind P, "fiber Optic Communication Systems", 2nd edition, Wiley, NewYork,1997
2. Principles of Biochemistry Albert L.Lehninger, David Lee Nelson,Michael M. 2005, Fourth Edition.
3. Sensors and Transducers D. Patranabis Prentice-Hall of India Pvt.Ltd August 15, 2004
4. Jacob Fraden, " Hand Book of Modern Sensors: physics, Designs and Applications", 3rd ed.,Springer, 2003.