Name of the Department: Electronics

OEC: Energy Devices and Sensors

Course Title: Energy Devices and Sensors	**Course code: 21BSCOEEL**
Total Contact Hours: 42	**Course Credits:** 03
Internal Assessment Marks: 40 marks	**Duration of SEE:** 03 Hours
Semester End Examination Marks: 60 marks	

Course Outcomes (COs):

At the end of the course, students will be able to:

1. Describe the performance of transducers.
2. Explain the functions of all the types of Sensors.
3. Explain signal conditioning and DAQ systems.
4. Use various test instruments.

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Unit	Description	Hours
1	**Transducers:** Transducers –Classification of transducers Strain gauge - Types-uses. Construction, operation and applications of photo electric transducer, LVDT, RVDT and Load cell.	09
2	**Motion, Proximity and Ranging Sensors:** SENSORS IR range sensor – IR proximity sensor- Ultrasonic range sensor- Touch Sensor. Motion Sensors – Potentiometers, Resolver, Encoders – Optical, Magnetic, Inductive, Capacitive, GPS, Bluetooth, Range Sensors – RF beacons, Ultrasonic Ranging, Reflective beacons, Laser Range Sensor (LIDAR).	09
3	**Force, Magnetic and Heading Sensors:** Strain Gage, Load Cell, Magnetic Sensors -types, principle, requirement and advantages: Magneto resistive – Hall Effect – Current sensor Heading Sensors – Compass, Gyroscope, Inclinometers.	08
4	**Signal Conditioning and DAQ Systems:** Amplification – Filtering – Sample and Hold circuits – Data Acquisition: Single channel and multi channel data acquisition – Data logging – applications – Automobile, Aerospace, Home appliances, Manufacturing, Environmental monitoring.	08
5	**Test Instruments:** Digital voltmeter –Types (to list only) - Basic block diagram of DVM -	08

	Block diagram of Digital multimeter- Advantages over analog instruments - Block diagram of Digital frequency counter– Simple PC based Data Acquisition system – Block diagram.	

References:

1. Patranabis D, Sensors and Transducers, 2nd Edition, PHI, New Delhi, 2010.
2. John Turner and Martyn Hill, Instrumentation for Engineers and Scientists, Oxford Science Publications, 1999.
3. Richard Zurawski, Industrial Communication Technology Handbook 2nd edition, CRC Press, 2015.