

## ASSIGNMENT 1: BFF3302 SENSORS AND INSTRUMENTATION SYSTEMS

You are divided into 10 groups by which each group is assigned with sensor/instrument. For each sensor/instrument, you need to find and explain the following information by means of presentation:

- i. Different **types/structures** of sensor/instrument available in the market. What is/are the sensors/instrument are used for? Please include the important pages of datasheet of the component/sensor/instrument.
- ii. **Technical characteristic** (static and dynamic characteristics)
- iii. **Working principle**
- iv. How it is connected with other instrument/device (i.e. how it is used to measure/sense and how to display the measured value). Include some samples of wiring on how the sensor/instrument is connected with other device using simulation software (e.g. Multisim, Simulink, Proteus, etc.). How to **program** these sensor/instrument using the available microcontroller module (e.g. Arduino, PIC).
- v. **Analyse** (with mathematical calculation) the circuit that you are created based on the input and output characteristics. (E.g. the amplitude, frequency, rising time, sensitivity, response, error, etc.)
- vi. What and how the **possibility of creating another type of sensor** using the available components.
- vii. All **reference** that used in the assignment need to be properly cited. Provide your report in **presentation slide** and in **IEEE paper format**.

The following sensors/instrument are provided for each group:

Group	Sensor/Instrument
1	Temperature sensor
2	Gyroscope/Gyrometer and humidity sensor
3	Accelerometer/motion and vibration sensor
4	Gyrometer with accelerometer sensor
5	Force/torque/tension sensor or strain gauge
6	Infrared sensor and Ultrasonic sensor
7	Gas sensor
8	Inductive and capacitive sensor
9	Photo resistor
10	Encoder (DC motor with encoder)