



## 2021 Sec 4 Advanced Physics

### Arduino Lesson 3 – Ultrasonic Sensor

Name: \_\_\_\_\_ ( ) Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Objectives:** At the end of this lesson, you would be able to

1. Create a simple ultrasonic sensor circuit connected to the Arduino
2. Understand and modify the sketch for ultrasonic sensor circuit
3. Use the serial monitor to display outputs from the Arduino

**Assignment:** Ultrasonic sensor

Connect the four pins of the ultrasonic sensor to the following pins of the Arduino:

Vcc – 5V power pin

Trig – pin 12

Echo – pin 13

GND – GND pin

Open a new sketch and type in the following (don't forget to save as you go along):

```
const int TRIG_PIN = 12;
const int ECHO_PIN = 13;

void setup() {
  Serial.begin(9600);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
}

void loop() {
  long duration, distanceCm;
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
```

```
digitalWrite(TRIG_PIN, LOW);
duration = pulseIn(ECHO_PIN, HIGH);

distanceCm = (duration*0.034)/2;
Serial.print(distanceCm);
Serial.print(" cm");
Serial.println();
delay(500);
}
```

Click on the “**serial monitor**” icon (top right corner) to open another window.

Select “9600 baud” (bottom right corner menu).

View changes in the distance readings by moving the sensor towards/away from a flat hard surface.

1. What applications could this circuit have?
2. What is the maximum distance your sensor can measure?
3. How could you test the accuracy of the distance measurements?