

INDIVIDUAL ONLINE EXPERIMENT MAY 2020 (covid ed)

(FOLLOW the FORMAT !) Do NOT use old "OT" Format, Failed grade report.

Now format, new questions and online activities. DO NOT USE OT. Easy detect.

No handwritten during online class !

NO GROUPINGS! ALL INDIVIDUALLY DONE.

PERFORM INDIVIDUAL ONLINE VIRTUAL EXPERIMENT

After experiment performance. SUBMIT computerized report next MEETING !
(NOT next week)

SUBMIT THROUGH BLACKBOARD ASSIGNMENT SECTION

and always click "SAFE ASSIGN", you can submit as many times as you want. UNLI.

ALWAYS OBSERVED THE DUE DATE.

Late submission can still submit up to the END of the quarterm.

REMEMBER to always include as many PICTURES with your name inside every step of the way, to prove you done it yourself.

MECHATRONICS _(course code) SECTION___ ONLINE EXPERIMENT NO. ___

ONLINE Experiment TITLE : _____ (CENTERED)

STUDENT NAME: _____ ONLINE Date Performed: _____

Student No. _____ ONLINE Date Submitted: _____

Course and Year: _____ Professor: Engr. Edward Ang

*** IF submitted LATE REPORTs, then write the ONLINE DATE SUBMITTED.

DISCUSSION:

(WHAT IS THIS EXPERIMENT ALL ABOUT ?) What do you think? Your wordings.

LEARNING OBJECTIVES:

(WHAT WILL YOU LEARN FROM THIS SPECIFIC EXPERIMENT/S?)

This experiment presents a methodology for designing project courses for assessing a number of student outcomes. Mechanical AND Manufacturing Engineering programs have grappled with methods for assessing some of the ABET outcomes, especially those skills which are not taught in the traditional engineering programs.

The methodology discussed in this paper has made it possible to identify problems encountered by students in these outcome skills, thereby, facilitating adjustment in course content and delivery, and formulation of plans to assist students to improve on these skills. The methodology also makes it possible to document students' performance in these outcomes. The documentation is used to generate outcome specific binders of students' work that are vital for ABET accreditation.

Course Objectives and Anticipated Student Outcomes (DO NOT reduce the letters !)

Write what you ONLINELY learn or experience PER LETTER !

The experiment should emphasize design, experimentation and/or hands-on skills.

The experiment should offer opportunity for creativity.

The experiment should allow teamwork among students, but not during online.

The goal of this experiment are to ensure the students have the necessary exposure to engineering practice that broadens their abilities towards THE ABET “a” to “k” and “l” outcomes. The ABET outcomes taught and assessed in this course are:

(Check/Think, if the following Student outcomes have been addressed by this SPECIFIC experiment and write how and why?)

“A” Ability to apply knowledge of mathematics, science, and engineering

“B” Ability to design and conduct experiments as well as analyze and interpret data

“C” Ability to design a system to meet desired needs

“D” Ability to function on multidisciplinary teams

“E” Ability to identify, formulate, and solve engineering problems

“F” Understanding of professional and ethical responsibility

(sample: did you copy from your classmate?)

“G” Ability to communicate effectively

“H” Broad education necessary to understand the impact of engineering solutions in a global/societal context

“I” Recognition of the needs for and ability to engage in lifelong learning

“J” Knowledge of contemporary issues

“K” Ability to use the techniques, skills, and modern engineering tools for engineering practice

“L” Knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments

List of Materials needed for this Experiment: I need PICTURES of EACH parts.

(go to to the reference Arduino book)(take ONLINE pictures per item!)

1.Name of the material and description (dimension, size, WIRE LENGTH, color, etc) PICTURES!!! Pictures !! WITH LABEL/TAGS EACH PICTURES.

2.

3.

For Computerized Report: take a picture of the ONLINE ARDUINO AND BREADBOARD PROTOTYPE FULLY SET UP HERE with label for each part.

List of ONLINE SAFETY procedures implemented in this experiment PUT PICTURES WITH EXPLANATION

(not the same with the Arduino manual)(include Safety !!!)(take **pictures** with you doing the ONLINE experiments) (Do not copy from any of your classmate) make you OWN procedures ! From assembly to dis-assembly. Pictures every step of the way !!

Include in the procedures, HOW did you download the cellphone APP. ?? if applicable.

Step 1

Step 2

Write the complete Arduino Program use in this experiment with each line explanation what are the commands/syntax used: (your understanding)

1. program line ----- // your explanation

2.

Data Gathered: WITH CALIBRATION_(tabulate with table)

What SOFTWARE OR CELLPHONE APP did you used to get the DATA ???

(calibrate hardware to software code) (Experiment with the programming)

Get data and or find a way to generate date.

Tinker with the program SEE the result/data. Tabulate it. Write the individual result.

Analysis of the Experiment done

EXPLAIN EACH of the DATA gathered.

WHAT SOFTWARE or CELLPHONE APP did you use to get the DATA? HOW?

WHY or HOW did you **FAIL** and SUCCEED?

What you learn and experience this specific experiment, write a lot.

(Do not copy from any of your classmate) make you OWN

Recommendation:

What are your recommendations and write a lot.

What do you suggest to CORRECT your experiment FAILURE

(Do not copy from any of your classmate) make you OWN

Conclusion:

What do you conclude in this experiment ! A very unique conclusion.

(Do not copy from any of your classmate) make you OWN

REFERENCES:

CITE REFERENCES USED IN YOUR EXPERIMENTS.

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Answers to questions:

(ASK YOUR PROFESSOR REGARDING THE EXPERIMENT title and experiment no.)

Answer these questions posted for **EACH EXPERIMENT as you performed it!**

Get to Know Your Tools

- a. Describe the relationship between voltage, resistance and current.
- b. Explain electrical current will seek the path of least resistance to Ground.
- c. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Spaceship Interface

- a. What function enables you to program efficiently the lighting up of several LED's?
- b. What are "void setup and void loop" do in the experiment programming code?
- c. If I change the delay to 6000, what do you think will happen to the blinking LED? Check using the online experiment.
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Love-o-Meter

- a. How do you produce a GRAPH in the computer from Arduino IDE? Check your online experiment.
- b. What function enables you to read the input from a pin?
- c. How does digital and manual thermometer differ getting temperature readings ?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Color Mixing Lamp

- a. How does the LDR Work?
- b. Does the resistance increase as it receives more light?
- c. What is the necessary program function to read analog inputs from your experiment?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Mood Cue

- a. How does the potentiometer function in this experiment? Explain.
- b. What is the function of the capacitor in the circuit?
- c. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Light Theremin

- a. How do you produce a tone depending on the light perceived by the microcontroller (Arduino UNO in our case).
- b. From the experiment change 5 volts to 3.3 volts? Is there a change in sound? Why?
- c. How does the “map ()” function in this experiment?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Keyboard Instrument

- a. Describe a resistor ladder ?
- b. Write a line program to read an analog input on an Arduino, map the result to the data range you just use to play a tone on a speaker.
- c. What is the difference between frequency and decibel ?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Digital Hourglass

- a. Explain how does “delay () and millis ()” function in this experiment ?
- b. Describe how does six LEDs work in your experiment?
- c. What is an accelerometer? Research it ! and explain its function.
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

Motorized Pinwheel

- a. Why do we need MOSFET and or transistor in this experiment?
- b. Can you use AC motor in this experiment ? Why ?
- c. Explain the role of the extra battery in this experiment ? Why the need?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

FLEX SENSOR Experiment

- a. What are the limitations of using flex sensor?
- b. What is the output signal of a flex sensor?
- c. How does the FLEX Sensor related to an ordinary resistor? Explain.
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

SERVO MOTOR Experiment

- a. Is it possible to code microservo to automatically stop when the speed of rotation getting slower? How?
- b. What is the main difference between stepper motor and servo motor ?
- c. How does torque related to servo motor? And to your experiment?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

SONAR Distance Sensor Experiment

- a. Write the complete as possible, specifications of the sonar sensor you used in this experiment. Check your experiment. Research it.
- b. With regard to sonar, reflected sound pulses are also known as ?
- c. In the experiment, what is the maximum distance the sonar sensor can detect? Why?
- d. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

FOR DIY EXPERIMENT

- a. Give a TITLE for your DIY experiment.
- b. Describe the CONSUMER APPLICATION OF YOUR EXPERIMENT.
- c. Individually suggest electrical and mechanical standards or codes and local or international applicable in this experiment. Cite source/s.

10 Zoetrope

(if performed, ask the instructor)

11 Crystal Ball

(if performed, ask the instructor)

12 Knock Lock

(if performed, ask the instructor)

13 Touchy-feely Lamp

(if performed, ask the instructor)

14 Tweak the Arduino Logo

(if performed, ask the instructor)

15 Hacking Buttons

(if performed, ask the instructor)