TESTS AND EXPERIMENTS	
Course Code: CPE 103	**Program: BSCPE**
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1. Objective:

Demonstrate testing procedures and results of the following:

1. Functionality of each subsystem (Success Rate)
2. Accuracy of Sensors

2. Discussion :

The importance of testing of systems and projects are crucial to following standards that must meet, for example is the ISO 5725-1: 2020 - Accuracy of Measurement Methods and Results, where it is stated that the margin of error should be only 5%. Therefore, the result is considered accurate if the percentage accuracy is greater than or equal to 95%. This ensures that the devices we are making is reliable, and robust for the consumers to use.

3. Resources:

The document will require the following software, tools and equipment:

1. Computer with Arduino IDE
2. Thermometer or any temperature reading tool

4. Procedures

Document and accomplish the procedures

1. Experimental Setup
2. Equipment Required
3. Attachments (showing experiments)
4. Link to video demonstration on requirement 2
5. Data Analysis of Testing

5. Experimental Setup

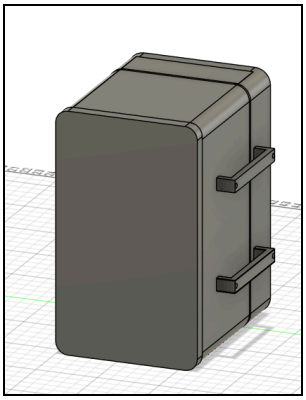
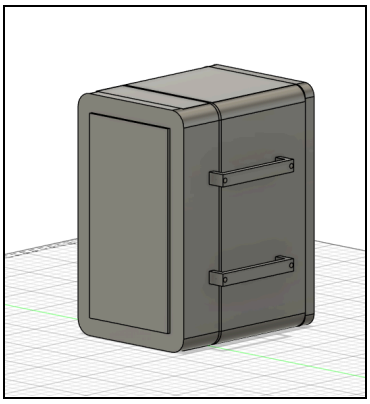
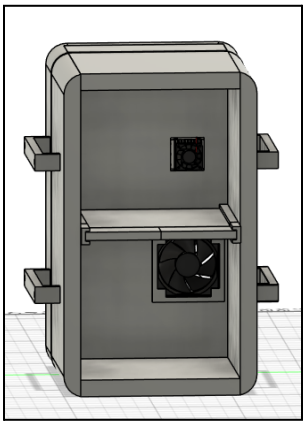
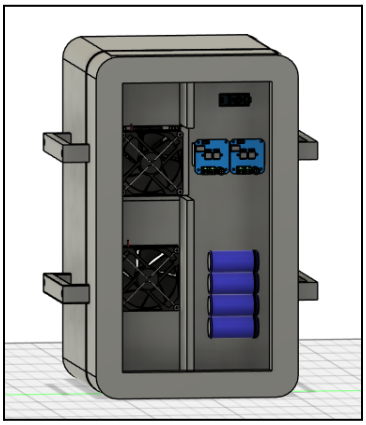
The device will be run for 30 mins with load and no load in the compartments, and record the data with an interval of 5 mins, after this we document the results of the test for success rate, and accuracy results.

6. Results

Project Details:

Problem:	Insulation boxes have been the common or general usage of delivery systems in the world, to keep food either warm or cold inside and prevent it from getting spoiled on the way to the customers address.
Key Stakeholders:	Small business owners who are concerned with the quality of food that they serve over delivery.
Solution Name:	ThermoDeliver
Project Description:	A sensor-driven temperature regulation system for food delivery

Concept Art (Updated):

Functionality of each subsystem

Trial Number	Temperature Range	Test Duration	Test Load	Remarks
1	25°C-29°C	5mins	Honey Lemon Tea	31°C(Within Range)
2	25°C-29°C	10mins	Honey Lemon Tea	29°C(Within Range)
3	25°C-29°C	15mins	Honey Lemon Tea	28.59°C(Within Range)
4	25°C-29°C	20mins	Honey Lemon Tea	27.79°C(Within Range)
5	25°C-29°C	30mins	Honey Lemon	28.59°C(Within Range)

			Tea	
Total Average Percentage Accuracy				100%

Table 1: Cooler Compartment with load

Trial Number	Temperature Range	Test Duration	Test Load	Remarks
1	20°C-27°C	5mins	Non	31.45C (Out of Range)
2	20°C-27°C	10mins	Non	30.52C (Out of Range)
3	20°C-27°C	15mins	Non	30.49C (Out of Range)
4	20°C-27°C	20mins	Non	30.30C (Out of Range)
5	20°C-27°C	30mins	Non	30.12C (Out of Range)
Total Average Percentage Accuracy				0%

Table 2: Cooler Compartment with no load

Trial Number	Temperature Range	Test Duration	Test Load	Remarks
1	30°C - 45°C	5mins	Peach Mango Pie	37.9C (Within Range)
2	30°C - 45°C	10mins	Peach Mango Pie	39.5C (Within Range)
3	30°C - 45°C	15mins	Peach Mango Pie	41.9C (Within Range
4	30°C - 45°C	20mins	Peach Mango Pie	43.2C (Within Range)
5	30°C - 45°C	30mins	Peach Mango	42.2C (Within Range)

			Pie	
Total Average Percentage Accuracy				100%

Table 3: Heater Compartment with load

Trial Number	Temperature Range	Test Duration	Test Load	Remarks
1	30°C - 45°C	5mins	Non	36.5°C(Within Range)
2	30°C - 45°C	10mins	Non	38.4°C(Within Range)
3	30°C - 45°C	15mins	Non	41.2°C(Within Range)
4	30°C - 45°C	20mins	Non	42.09°C(Within Range)
5	30°C - 45°C	30mins	Non	41.7°C(Within Range)
Total Average Percentage Accuracy				100%

Table 4: Heater Compartment with no load

Accuracy of Sensors

Trial Number	Timestamp	Actual reading(°C)	Sensor reading(°C)
1	1:20AM - 1:25AM	35.4	35
2	1:30AM - 1:35AM	35	34.7
3	1:35AM - 1:40AM	34.7	34.5
4	1:45AM - 1:50AM	34.6	34.5
5	1:50AM - 1:55AM	34.5	34.5
Total:		34.84	34.643
Average Percentage Accuracy (%):			99.42%

7. Data Analysis

Based on the results both the functionality and accuracy of sensors prove that both are success and accurate in their perspective readings and functionality, however the time took longer for the cooler compartment to cool, due to environmental factors, like the heat in air, lack of power, and the area it needed to cool, however the accuracy of sensor did prove itself that it is accurate.

8. Summary and Conclusions

In summary, conducting functionality and accuracy tests demonstrates their indispensability for ensuring the success, robustness, and reliability of a system. These tests evaluate new devices, whether they are in the process of invention or enhancement, aiming to augment the capabilities of existing or prospective technologies. Such rigorous testing fosters consumer trust in the product. In conclusion, engaging in these activities aids students in comprehending how to effectively test and analyze devices, potentially identifying defects and ensuring product quality.

9. Learnings and Contributions of each member

Buan: For this final testing and experimentation, we gained valuable insights into how our prototype performs in various conditions such as having different loads inside each compartment (heating and cooling). Through rigorous experimentation, we have confirmed its ability to maintain consistent temperatures that ensures the quality of the food during delivery. My contribution to this phase involved conducting the actual testing and experimentation of our prototype, which provided data for assessing its performance in various conditions.

de Leon: In this final testing and experimentation phase, I've learned the importance of adhering to ISO standards when conducting tests and experiments for our project. My contribution involved designing experiments and documenting the results meticulously, ensuring that we meet these standards.

Dupaya: In this final test experiment and documentations I learned how to follow ISO standards, in testing and experimenting of our project. I contributed to the designing of the experiment and documentation results of the project.

Guevarra: In this activity that involves the testing and experimentation of our prototype, I was able to learn how to establish and validate the test results to existing standards wherein we tested the prototype's ability to maintain temperature. I contributed to the testing and analyzing of each trial result.