Florida CTE

Engineering & Technology Education (2024-25): Engineering Design and Development (8600650)

Identify, define, and justify a technical design problem for resolution. The student will be able to: 1.0	1 **Brainstorm problem statements for unique innovations or inventions.** 1.1 2 **Write a concise problem statement using technical writing skills.** 1.2 3 **Document research that justifies using the problem statement for the engineering design and development project.** 1.3
Conduct research and investigation into the stated problem. The student will be able to: 2.0	1 **Use a list of specifications and constraints identified in a decision matrix to develop a list of alternative solutions to the stated problem.** 2.1 2 **Research and identify patents related to their identified problem.** 2.2 3 **Conduct research to investigate and determine the merit of the alternative solution based on past solutions to the problem.** 2.3 4 **Explain the feasibility of the solution based on his or her research.** 2. 5 **Develop research strategies for the solution, including the use of surveys, phone interviews, and personal contact with experts related to the field of the technical problem.** 2.5 6 **Create a matrix table to analyze the data found from the patent research.** 2.6 7 **Write a fictional scenario for an innovation of interest.** 2.7 8 **Conduct research and perform a trend analysis on a technical problem.** 2.8
Perform and graphically represent an evaluation of proposed design solutions using specific criteria, including product specifications.	1 **Create a description of the product specifications for the design solution.** 3.1 2 **Objectively evaluate proposed design solutions using specific criteria.** 3.2 3 **Select the best design solution option using a decision matrix.** 3.3

The student will be able to: 3.0	**4** Graphically represent the results of the design solution evaluation. 3.4
Design a solution to the problem and create a working prototype for testing. The student will be able to: 4.0	**1** Sketch all parts of the design solution including an isometric view of the assembled product. 4.1
	2 Create a set of working drawings for their design solution. 4.2
	3 Interpret and apply the feedback they receive from experts to improve the design solution. 4.3
	4 Refine the design solution, if necessary, based upon expert feedback. 4.4
	5 Create a detailed set of instructions for production and assembly of a testable prototype based on the information gained through their research. 4.5
	6 Identify methods and sources for obtaining materials and supplies. 4.6
	7 Compile a materials list that includes vendors and cost for all necessary materials and equipment to build the prototype. 4.7
	8 Build a working prototype that can be tested. 4.8
Evaluate and select appropriate testing methodologies for testing the product, conduct product testing, refine the design as needed, and document the process and results. The student will be able to: 5.0	**1** Select and describe a valid testing method that will be used to accurately evaluate the design solution's ability to solve their problem. 5.1
	2 Prepare a description of the testing method that will be used to valid the designed solution. 5.2
	3 Create a valid justification for the selected testing method. 5.
	4 Devise a list of testing criteria that will be used to evaluate the success or failure of the prototype testing 5.
	5 Create a detailed set of instructions for testing the prototype that will be valid, repeatable, and reliable. 5.5
	6 Apply the appropriate statistical analysis tools to the test results to ensure validity. 5.6
	7 Identify, define, and implement necessary modifications to the design based upon the test results and expert feedback. 5.7
	8 Evaluate and explain the effectiveness of solving the design problem as defined. 5.8
Create and deliver a formal presentation of the solution to the	**1** Gather data and information compiled throughout the project and create a technical research paper, presentation, or three panel display of the design solution. 6.1

problem. The student will be able to: 6.0

2. **Create a website, if appropriate, in order to depict all aspects of the design solution.** 6.2

3. **Choose one of the formats used to depict the design solution, such as technical research paper, PowerPoint, three panel display, or website, if created, for the presentation of the solution to the problem.** 6.3

4. **Orally present a technical presentation on the design solution.** 6.4