ثانويـة التكنولوجيـا التطبيقيـة
Applied Technology High School

PROPOSED GRADUATION PROJECTS

ACADEMIC YEAR: 2012-2013

ACADEMIC SERVICES

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PROJECTS

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Bottle Filling Machine

Objective:

To design and construct automated bottle filling machine prototype that fills and seals bottles.

Minimum Specifications:

- The machine should be capable of filling and sealing bottles and transferring them to the packaging stage.
- It should be operated automatically.
- The prototype size should not exceed 50 cm x 60 cm x 50 cm.

Winning Criteria:

- The quality on which the machine performs the task.
- The durability, reliability and efficiency of the machine.
- The safe operation.
- The machine cost.

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Pinball Machine

Objective:

To design and construct a pinball machine.

Minimum Specifications:

- The prototype should include several targets with different scoring values.
- The prototype should include LCD to show the score.
- The machine should be automatically operated.
- The prototype size should not exceed 50 cm x 50 cm x 50 cm.

Winning Criteria:

- The options available in the machine.
- The safe operation.
- The machine cost.

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CDs/DVDs Vending Machine

Objective:

To design and construct a vending machine prototype that offers CDs and/or DVDs.

Minimum Specifications:

- The machine should have a minimum of 2 shelves.
- Each shelf should be able to hold a minimum of 10 CDs or DVDs.
- The prototype footprint should not exceed 50 cm × 50 cm area.

Winning Criteria:

- Optimization of stock size and number of products.
- Machine cost.

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Liquid Level Control and Indication System

Objective:

Design a system to control the flow in a tank using sensors and indication lamps.

Minimum Specifications:

- The level should be maintained within two preset values (minimum and maximum).
- If the level falls below the minimum set value, a pump should be activated, and if it falls above the maximum preset value a valve should be activated.
- A warning system should also be installed in case of failure of pump or valve.
- The prototype size should not exceed 50 cm length, 30 cm width, 50 cm height.

Winning Criteria:

- Innovation and creativity in the design.
- The number of options available in the prototype.
- The safe operation.
- The prototype size and cost.

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Air-Conditioned Suit

Objective:

To design an outfit with an intelligent cooling system.

Minimum Specifications:

- The system should be battery operated.
- The outfit should provide adjustable cooling to the person wearing it according to the temperature of the surrounding environment, for example it should reduce the cooling if the person moves inside an air-conditioned room.
- The outfit must include a provision to cool different parts of the outfit to different temperatures.
- The prototype size should not exceed (60 cm length, 40 cm width, 5 cm thickness).

Challenge Criteria:

- It must include a provision to store preset programs to be used for different people based on preferences/choices.
  (*Note: This criterion will ensure bonus points*)

Winning Criteria:

- Innovation and creativity in the design.
- The number of options available in the prototype.
- The safe operation.
- The prototype size, cost and aesthetics.

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Intelligent Infant's Cradle

Objective:

Design and build an infant's cradle that is equipped with a smart system to monitor the infant.

Minimum Specifications:

- The cradle should be equipped with a system to alert the mother when the infant cries through warning sound and indicator systems.
- It should have a reset button to indicate a response from an adult.
- The cradle should start rocking and play music when no quick response from adults is observed.
- It should be automatically operated.
- The prototype size should not exceed 50cm length, 30 cm width, and 100 cm height (with supporting frame).

Challenge Criteria:

- The ability to send an SMS to the mother when the infant cries.
  (*Note: This criterion will ensure bonus points*)

Winning Criteria:

- Innovation and creativity in the design.
- The number of options available in the prototype.
- The safe operation.
- The prototype size and cost.

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Smart Road Sweeper

Objective:

Design a road sweeper that can detect the shoulder of the road while moving forward.

Minimum Specifications:

- The sweeper should be able to move forward, left and right.
- It should have a vacuum system to collect the dust.
- It can sense the shoulder of the road and keep a fixed distance away from it.
- It should have a flashing warning light to alert pedestrians.
- The prototype size should not exceed 60 cm length x 40 cm width x 50 cm height.

Winning Criteria:

- The durability and reliability of the machine.
- The safe operation.
- The machine cost.

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Tennis Ball Canon

Objective:

Design a tennis ball canon for the purpose of training a person to play tennis.

Minimum Specifications:

- The machine should have an adjustable timer to control the number of balls per minute.
- The distance the ball travels should also be adjustable
- The machine must operate automatically and display the time and number of balls used.
- The prototype size should not exceed 60 cm x 60 cm x 60 cm.

Challenge Criteria:

- It includes sensors to count the number of balls the person is able to return in a set period of time.
  (*Note: This criterion will ensure bonus points*)

Winning Criteria:

- Innovation and creativity in the design.
- The number of options available in the prototype.
- The safe operation.
- The prototype size and cost.

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Intelligent Electric Wheelchair

Objective:

Design and build an intelligent electric wheelchair.

Minimum Specifications:

- The wheelchair should be able to move forward, backward, left and right.
- It should be controlled using a user-friendly controller placed conveniently for a right-handed adult.
- The wheelchair should also be able to go up and down typical ramps such as those available at hospitals and malls.
- It should be operated using a rechargeable battery.

Winning Criteria:

- The reliability of the prototype.
- Ease of use by person with mobility restrictions.
- Innovation and creativity in the design.
- The prototype size and cost.

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Exercise Monitoring System

Objective:

To design and construct an intelligent exercise monitoring system which can monitor the walk or run of the person wearing it, and therefore improve their BMI.

Minimum Specifications:

- The system must be able to calculate the number of steps, average speed, time and distance of the person walking or running.
- The system should have an LCD to display the measurements mentioned above.
- The system should be battery operated.
- The system should be light in weight and easy to attach to clothing or be worn by a young adult.

Challenge Criteria:

- The system is able to store the measurements in memory for analysis.

(Note: This criterion will ensure bonus points)

Winning Criteria:

- The reliability of the prototype.
- Innovation and creativity in the design.
- The prototype cost.