ثانويـة التكنولوجيـا التطبيقيـة
Applied Technology High School

PROPOSED GRADUATION PROJECTS

ACADEMIC YEAR: 2011-2012

ACADEMIC SERVICES

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PROJECTS

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CHICKEN EGG INCUBATOR

Objective:

To design and construct a “Chicken Egg Incubator” that can hatch chicken eggs.

Minimum Specifications:

- The incubator must be able to hold and hatch a minimum of 6 and a maximum of 10 eggs.
- The temperature and humidity in the incubator must be controlled automatically and displayed.
- The incubator must include meshing, dimmer control and proper airflow.
- The prototype size should not exceed 100 cm length, 100 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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ROBOTIC LAWN MOWER

Objective:

To design and construct an autonomous Robotic Lawn Mower that can cut lawn grass within the area to be mowed set by the user.

Minimum Specifications:

- The machine must start at the scheduled time and must operate autonomously.
- It must cut grass at the same level in each path.
- The machine should be able to detect obstacles and pause when required.
- If the machine is lifted or overturned the blade should stop to prevent hazards to people.
- The prototype size should not exceed 60cm x 60 cm x 60 cm.

Challenge Criteria:

- It should have the provision to be programmed to mow grass within the borders set by the user.
- The lawn mower must be programmed to return to the station on a wireless command.
  (*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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AUTOMATIC RAILWAY LEVEL CROSSING CONTROL

Objective:

To design and construct a railway level crossing system that can control barriers to warn and stop vehicles crossing railway tracks when a train is approaching.

Minimum Specifications:

- The system must display a warning message on a display unit 3 minutes before the train arrives at the level crossing.
- Warning lights at the level crossing must flash at the same time as warning message is displayed.
- The siren must go off 2 minutes before the train arrives at the level crossing to give an indication of the train's arrival.
- The barriers must close 1 minute before the train arrives at the level crossing.
- Barriers open and all warnings must stop 1 minute after the train has left the level crossing
- The prototype size should not exceed 60 cm length, 60 cm width, 50 cm height.

Challenge Criteria:

- It must include a provision to send a warning signal to train if a barrier fails to close.

  (*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, prototype size and cost.

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SMART TENT

Objective:

To design and construct a "Smart Tent" that can close and open automatically, and has wireless/SMS control of a security system, appliances, light system, irrigation system and water reservoirs.

Minimum Specifications:

- The tent should open and close automatically.
- The security system, appliances, light system, irrigation system and the water reservoirs are to be controlled through wireless control hub.
- The prototype size should not exceed 100 cm length, 100 cm width, 50 cm height.

Challenge Criteria:

- The gadgets/appliances must be operated with solar power.
  (*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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ELECTRIC BLANKET

Objective:

To design and construct an "Electric Blanket" that can maintain a desired temperature to keep your body warm.

Minimum Specifications:

- The blanket must maintain the desired temperature automatically.
- The blanket must include a provision to heat different parts of the blanket to different temperatures.
- The blanket must include timer setting to program it to pre-warm it at certain times and shut-it off after certain time.
- The prototype size should not exceed (120 cm length, 60 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 and cost.

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BASKETBALL GAME MACHINE

Objective:

To design and construct a coin operated automatic "Basketball Game Machine" for the purpose of entertainment.

Minimum Specifications:

- The player should insert a coin to release the ball and start the game.
- The prototype should include a display unit to show the score.
- The machine should play music while in use, and a different tone should be displayed when the player scores.
- The game should be time bound.
- The machine should be automatically operated.
- The prototype size should not exceed 100cm length, 60 cm width, and 100 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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AUTOMATIC SCRAP COLLECTING VEHICLE

Objective:

To design and construct an automatic scrap-collecting vehicle to remove glass scraps from the workstation to the disposal area.

Minimum Specifications:

- The machine should be capable of removing the shattered glass from the conveyor and transferring them to disposal area.
- It should be operated automatically.
- The vehicle must be guided through the conveyor by using sensors or any other control system.
- The prototype size should not exceed 50 cm length x 60 cm width x 50 cm height.

Winning Criteria:

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

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DISHWASHER

Objective:

To design and construct a dish washing machine prototype that washes dishes automatically.

Minimum Specifications:

- The machine should be capable of washing dishes with a selected cleaning option.
- The machine must operate automatically and display the time.
- The prototype size should not exceed 60 cm x 60 cm x 60 cm.

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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CLASSROOM MONITOR

Objective:

To design and construct a system which can capture images and text in the classroom and display those on nearby monitor to assist visually impaired (short-sighted) students in recognizing images and text.

Minimum Specifications:

- The system must have at least 2 CCTV cameras.
- The system must be able to enlarge captured images and text and filter noise.
- Student must be able to switch between cameras.
- Student must be able to control the amount of zoom needed, i.e. zoom in and out as necessary.
- Student control panel size must not exceed (10 cm length, 10 cm width, 5 cm height).

Winning Criteria:

- The reliability of the prototype.
- Minimum disruption caused for normal classroom setting.
- Innovation and creativity in the design.
- The prototype size and cost.

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INTELLIGENT CANE

Objective:

To design and construct an intelligent cane which can produce warning signals to guide a blind person away from potential obstacles.

Minimum Specifications:

- The cane must be a standard size for an adult male.
- The cane must be fitted with a sensor to detect obstacles.
- The sensor must produce warning sound for obstacles ahead, not more than 3 meters away.
- The horizontal and vertical angles of detection must not exceed 30º each.
- Waning sound must increase in frequency and volume as the distance to obstacle decreases.
- The cane must also vibrate when the distance to obstacle becomes less than 0.5 meters.

Winning Criteria:

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