

Society of Hispanic Professional Engineers  
July 2010



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# AHETEMS

## 2010 Design Competition Guidelines

### **THEME: Robotics**

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# Purpose

The AHETEMS Design Competition is intended to stimulate a creative, intellectual and entrepreneurial spirit, develop technical presentation skills, and instill cooperation essential in a technical design project. This competition intends to test the technical and business intellect of Latino/a engineering and science students in the fabrication of a cost-effective product. Competitors must research, design, build, and test a marketable product and write a relevant technical paper within an allotted time frame based on the theme for the competition.

**The technical theme for the 2010 AHETEMS Design Competition will be announced in the summer 2010**

# Eligibility

1. Participants must be undergraduate students with a current SHPE membership. Students, who are not current SHPE members, must become SHPE members prior to submitting an entry for this competition.
2. Design teams may consist at a minimum of two (2) Latino/a undergraduate students and a maximum of six (6) Latino/a undergraduate students.
3. There is no limit on the number of design teams per college/university. However, all team members must be from the same institution.
4. Students may only compete as a registered member of one (1) team. If a student competes in more than one team, **all** those respective teams will be disqualified.
5. Designs, inventions, or processes funded by an external source (i.e., NSF grant, government research/training grant, corporate sponsored research) are not eligible for submission.
6. Senior projects or theses are not eligible for submission.

# Design Criteria

The theme for the 2010 AHETEMS Design Competition is Robotics. Robotics is the science and technology of robots, their design, manufacture and application. Robotics requires a working knowledge of electronics, mechanics, and software.

The design, based on the theme, must be a commercially marketable product that has both a unique social benefit and improves the quality of life, especially for the Hispanic community. This design should not be a duplicate of a currently existing commercial product, but may be an improvement to a currently existing commercial product. The design should be creative, but demonstrate technical merit.

**Design and build a robot, such that it will encourage and promote a child to be more physically active outside.** The design should encourage long term use by

rewarding the child, such as but not limited to new behaviors, new activities or new levels.

The design should take into account the following: the ability of the child to carry the robot or push it on wheels without the assistance of an adult, be durable in good weather conditions (*operation in rain, snow and any other form of precipitation does not need to be considered*), be safe for the child to use (no sharp edges, shock hazards, etc) and reproducibility of the design.

The team may create an entirely new robot or modify a non-robotic device currently on the market. Teams are encouraged but not required to incorporate children's current interests in toys, music and activities.

Bonus: Design it such that it is bilingual with the way it communicates with the child (examples: button labels, speech).

## Team Mentors

Each team may solicit the assistance of no more than two (2) graduate students or engineering professionals from industry, academia, or government to serve as mentors. The mentor(s) may assist the team in detailing the design, and if selected as a team finalist, in developing the presentation charts and rehearsing the oral presentation. The name(s) and organization(s) of the mentor(s) **must** be included in the design concept paper.

## Preliminary Stage

### REQUIRED DOCUMENTATION

Students interested in participating in the design competition must submit the Design Competition Entry Form, an abstract and a design concept paper. *No materials will be accepted by fax.* Materials may be submitted electronically to designcomp@shpe.org in MS Word 97 or later. No Portable Document Format (PDF) will be accepted. Abstracts and design concept papers received in any format other than Microsoft Word will be automatically disqualified.

### DEADLINE

The Design Competition Entry Form, abstract and draft design concept paper must be postmarked by **11:59 pm EST, Wednesday, September 7, 2010**. Entries postmarked after this date/time will be automatically disqualified.

## **ABSTRACT**

The length of the abstract should be between 300 – 400 words. It should be a concise summary of the design concept. The format of the abstract must adhere to the following:

- Typed,
- Single-spaced
- 1-inch margins,
- Times New Roman, and
- 12-pt font
- Submit with the abstract, a one page hand sketch of robot design with 2 views (top view and side view).

The abstract should include the following header:

**Title of Project (Bold, Centered, Times New Roman, 14 pt)**

Team Members (Centered, Times New Roman, 12 pt)

Institution (Centered, Times New Roman, 12 pt)

Institution City, State, Zip (Centered, Times New Roman, 12 pt)

***NOTE: The abstract will be judged on both content and adherence to formatting guidelines.***

## **DESIGN CONCEPT PAPER**

The length of the design concept paper is at the discretion of the design team. However, it should be sufficient to technically explain and illustrate the design concept to the reviewers. At minimum, the paper should include:

- 1) Introduction
- 2) Background
- 3) Intent of design
- 4) Statement of the problem the design is addressing
- 5) Proposed or actual design testing and evaluation
- 6) Cost Analysis
- 7) Conclusion
- 8) References

Graphs, charts, tables and references must adhere to **APA 5<sup>th</sup> Ed.** formatting.

The paper should also include detailed illustrations of the dimensions, scale, orthographic projection (top, side, front views), and a 3-D view of the design. A developmental/production cost analysis must also be included. You may make assumptions on the quantity to ensure a low cost. Segregate costs by non-recurring (engineering) and recurring (production) costs. Designs without a cost analysis will be immediately rejected.

The format of the design concept paper must adhere to the following:

- Typed,
- Single-spaced,
- 1-inch margins,
- Times New Roman, and
- 12 pt Font.

The paper should include the following header:

**Title of Project (Bold, Centered, Times New Roman, 14 pt)**

Team Members (Centered, Times New Roman, 12 pt)

Institution (Centered, Times New Roman, 12 pt))

Institution City, State, Zip (Centered, Times New Roman, 12 pt))

*NOTE: The paper will be judged on both content and adherence to formatting guidelines.*

## FINALIST STAGE

### SELECTION

A team of engineers from industry, academe and government will review the abstracts and draft design concept papers to select the top five (5) team finalists to proceed in the production of a design model or prototype and writing of the final design concept paper to be presented on Thursday, October 28, 2010 at the SHPE Conference in Cincinnati Oh.

The abstract and draft concept paper will be evaluated on a 150-point scale.

### WORKING MODEL/PROTOTYPE

Finalists must demonstrate a working model or prototype of their design at the 2010 SHPE Conference. Emphasis will be placed on demonstrating a working model or example of the design. Be sure that you account for every eventuality, and have a back-up plan or resource. Teams must plan ahead to ensure that they account for shipping or transportation costs or arrangements of their working model or prototype.

*NOTE: Team finalists, who fail to present a working model or prototype, will be required to reimburse any and all travel, pre-registration and design material stipends.*

*No further exceptions will be made to this rule.*

### FORMAL PRESENTATION

The team finalists will make a formal presentation before a panel of judges chosen from industry, academia, and government. The presentation will be open to the general audience attending the 2010 SHPE Conference.

Although presentations may be made using an LCD projector, presenters must supply their own laptops, input devices, jump drives, etc. Presentations will be limited to a maximum of twenty (20) minutes. An additional ten (10) minutes will be allotted for questions from the judges and the general audience.

The presentation will be evaluated on a 200-point scale.

## Pre-Registration, Travel and Design Materials Compensation

Each of the ten (10) team finalists will be awarded \$1,000 to develop their product<sup>1</sup>. No additional funds for shipping the prototype or otherwise will be provided. In addition, each team member will receive a four-night 2008 SHPE Conference pre-registration package and a \$100 travel allowance<sup>2</sup>. Each of the finalists must pre-register by October 1, 2010.

**NOTE: Students are expected to arrange their travel to arrive in time to be ready to present as early as 8:00 am local conference time, on Wednesday, October 27, 2010.**

## AWARDS

Winners will be announced at a designated time at the SHPE Conference. The following scholarship awards will be presented to the winning teams:

First Place	\$3,000
Second Place	\$2,500
Third Place	\$2,000
Fourth Place	\$1,500
Fifth Place	\$1,000

Pending funding availability, should both the product of the winning team warrant further development and the winning team choose to pursue a formal patent for their product, up to \$5,000 will be provided to the winning team to submit a technical patent.

## Information Release & Disclaimer

*By participating in the Design Competition, the authors and mentors of the design concept grant permission to SHPE, Inc. and AHETEMS, Inc. to publish and release, in whole or in part, information and illustrations about their design concept, participant photographs, contact information, and institutional and/or employer affiliation, and other such information for audio, video and print media. Furthermore, the authors and the mentors of the design concept retain the rights to further develop and/or market their own design concept. However, neither SHPE, Inc. nor AHETEMS, Inc. can guarantee the protection of the design concept.*

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<sup>1</sup> \$500 will be awarded prior to the SHPE Conference; \$500 will be awarded after the SHPE Conference. Teams are required to retain all receipts as they must be submitted to AHETEMS, Inc. to receive the appropriate compensation for the design materials.

<sup>2</sup> Participants, who either fail to pre-register for the four-night package, are responsible for paying the difference in registration costs.

## Contact Information

All questions should be directed to [designcomp@shpe.org](mailto:designcomp@shpe.org).

## Deadlines

September 7, 2010	Deadline for Design Form, abstract, and draft concept paper
September 9, 2010	Peer-Review Panel sends list of finalists to AHETEMS
September 10, 2010	Acceptance notices sent to ten finalist teams 50% of design materials stipend sent to finalists Abstracts of finalists sent to SHPE Magazine
October 1, 2010	Finalists must pre-register for SHPE Conference
October 6, 2010	21-Day Deadline for airline reservations
October 13, 2010	Final Design Concept Paper Due ( <i>Required to present</i> )
October 13, 2010	14-Day Deadline for airline reservations
October 15, 2010	Confirmation attendance notice sent to finalists
October 27, 2010	Finalists should arrive at SHPE Conference
October 28, 2010	Formal design competition presentation

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**DESIGN ENTRY FORM**

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College/University: \_\_\_\_\_

Title of Design: \_\_\_\_\_

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**Team Captain**

\_\_\_\_\_  
Name (First, Last)

\_\_\_\_\_  
Mailing Address/City/State/Zip

\_\_\_\_\_  
Primary Email Address

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Major Field of Study

Classification  
 Freshman    Sophomore    Junior    Senior

*NOTE: All correspondence, mailings, check disbursements, etc. will be sent to the Team Captain.*

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**Team Members (maximum of five):**

NAME (First, Last)	MAJOR	CLASSIFICATION
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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**Team Mentors (maximum of two)**

\_\_\_\_\_  
Name (First, Last)

\_\_\_\_\_  
Name (First, Last)

\_\_\_\_\_  
Place of Employment

\_\_\_\_\_  
Place of Employment

\_\_\_\_\_  
Primary Email Address

\_\_\_\_\_  
Primary Email Address

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**Submit form, abstract and concept paper to:**  
AHETEMS, Attn: Design Competition  
The University of Texas at Arlington, College of Engineering, Box 19019, Arlington, TX 76019-0019  
(817) 272-1116 (O) • (817) 272-2548 (F) • designcomp@shpe.org

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**PRELIMINARY ROUND  
JUDGE'S SCORE CARD \***

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**Project Name** \_\_\_\_\_

**Judge's Initials** \_\_\_\_\_

**ABSTRACT**

<b>30 Possible Points (20%)</b>	<b>Points Possible</b>	<b>Points Earned</b>
The extent, which the abstract meets the required word count of 300-350 words	5	
The extent, which the abstract conforms to the required formatting: typed, single-spaced, 1-inch margins, Times New Roman, 12 pt Font.	10	
The extent, which the abstract clearly summarizes the design concept.	15	
<b>Total Score</b>	<b>30</b>	

**PAPER**

<b>120 Possible Points (80%)</b>	<b>Points Possible</b>	<b>Points Earned</b>
Introduction	5	
Background	5	
Intent of Design	10	
Statement of the Problem the Design is Addressing	5	
Proposed or Actual Design Testing	10	
Detailed illustrations of the dimensions, scale, orthographic projection (top, side, front views), and a 3-D view of the design	10	
Developmental/Production Cost Analysis	10	
The format: typed, single-spaced, 1-inch margins, Times New Roman, 12 pt Font.	5	
References, tables, graphs, charts are in proper APA 5 <sup>th</sup> Ed.	5	
Overall, technically sufficient in explaining design concept	10	
Overall, sufficiently illustrates the design concept	10	
Overall Originality	15	
Overall Innovation	10	
Supporting Research	10	
<b>Total Score</b>	<b>120</b>	

Total Score (Abstract + Paper) \_\_\_\_\_

- *Subject to change.*

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**FINAL ROUND**

**JUDGE'S SCORE CARD \***

**Project Name** \_\_\_\_\_

**Judge's Initials** \_\_\_\_\_

**PRESENTATION/PROTOTYPE**

<b>160 Possible Points</b>	<b>Points Possible</b>	<b>Points Earned</b>
Creativity of Design	15	
Actual Design Testing	20	
Detailed illustrations of the dimensions, scale, orthographic projection (top, side, front views), and a 3-D view of the design	15	
Extent that a <b>working</b> model or prototype of the design is presented	50	
Developmental/Production Cost Analysis	10	
Overall, technically sufficient in explaining design concept	10	
Overall, sufficiently illustrates the design concept	10	
Overall Originality	10	
Does it reward child for long term use	10	
Patent potential of product (Reproducibility)	40	
Safety Use by a child (no sharp edges, shock hazards, etc)	10	
Bonus (Bilingual) Design it such that it is bilingual with the way it communicates with the child (examples: button labels, speech).	5	
<b>Total Score</b>	<b>200</b>	

Total Score \_\_\_\_\_

To what extent would you recommend that this product be pursued as a patented technology by the design team?

Highly  
Recommend

Recommend

Slightly  
Recommend

Do Not  
Recommend

\* *Subject to change.*