

**ADVANCING HISPANIC EXCELLENCE IN TECHNOLOGY, ENGINEERING, MATH AND
SCIENCE (AHETEMS)
2009 AHETEMS DESIGN COMPETITION GUIDELINES**

ADDENDUM

Design Competition Theme:

Adaptive/Assistive Technologies

Adaptive or assistive technologies are devices, equipment, or systems that enhance, increase, or maintain the physical and/or mental capabilities of persons with disabilities to accomplish daily living tasks, assist them in communication, education, work or recreation activities and help them achieve greater independence and enhance their quality of life.

Assistive Technology devices can help improve physical or mental functioning, overcome a disorder or impairment, help prevent the worsening of a condition, strengthen a physical or mental weakness, help improve a person's capacity to learn, or even replace a missing limb.

Some examples of adaptive technologies as described on RehabTool.com are listed below: For a full description and details, please visit <http://www.ahetems.org/undergraduate/design-competition/>

Communication Aids	Speech and Augmentative Communication Aids
Writing and Typing Aids	Computer Access Aids
Alternative Input Devices	Alternative Output Devices
Accessible Software	Universal Design
Daily Living Aids	Cognitive Aids
Environmental Controls & Switches	Home-Workplace Adaptations
Ergonomic Equipment	Hearing and Listening Aids
Mobility and Transportation Aids	Ambulatory Aids
Vehicle Conversions	Prosthetics and Orthotics
Recreation and Leisure Aids	Seating and Positioning Aids
Vision and Reading Aids	

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Communication Aids

Products and equipment designed to help persons with speech disabilities or writing difficulties to communicate. At its very simplest, augmentative communication can be a page with picture choices or alphabet letters that a person points to. It can also involve highly sophisticated speaking computers with on-screen communication boards and auditory or visual scanning.

Speech and Augmentative Communication Aids

Alternative and Augmentative Communication (AAC) involves alternate methods of communicating needs, feelings, ideas, and perceptions through the use of electronic and non-electronic devices that provide a means for expressive and receptive communication for persons with limited or no speech. Includes communication boards, speech synthesizers, text-to-speech software and hardware, head wands, light pointers, mouth sticks, signal systems, telephony equipment, etc.

Writing and Typing Aids

Includes tactile devices, Braille devices, note taking devices, spelling devices, word prediction/completion software, modified typewriters, portable typewriters, etc. Does not generally include products intended to facilitate computer access and usage (see Computer Access Aids).

Computer Access Aids

Hardware and software products that enables persons with disabilities to access, interact with, and use computers at home, work or school. Includes modified or alternate keyboards, switches activated by pressure, touch screens, special software, voice to text software, etc.

Alternative Input Devices

Includes alternative and adaptive keyboards, expanded keyboards, Keyguards, alternative and ergonomic mouse/pointing systems, head-operated pointing devices, Eyeglaze pointing devices, mouth/tongue pointing devices, Morse code input devices, brain-actuated pointing devices, switches, touch screens, voice input systems, speech-to-text software, voice recognition/voice command software, dictation software, on-screen keyboards, cursor enlargement software, ergonomic computer-based equipment, etc.

Alternative Output Devices

Computer-based output devices that generally enable Blind and Vision impaired persons to use or interact with a computer. Includes Braille display/output devices,

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Braille embosser/printers, screen reading software, screen magnification/enlargement software, large print monitor, etc.

Accessible Software

Includes software applications adapted for children and adults with disabilities, operating system accessibility options, accessible web browsers, etc.

Universal Design

Design methods, techniques and guidelines for making computers and their applications fully accessible to people with disabilities.

Daily Living Aids

Self-help devices that assist persons with disabilities in daily living activities such as dressing, personal hygiene, bathing, home maintenance, cooking, eating, etc. Includes reachers, adaptive clothing, modified eating utensils, adapted books, pencil holders, dressing aids, adapted personal hygiene aids, bathing accessories, feeding accessories, feeding devices, grab bars/grips/handles, grooming, hygiene, incontinent supplies, mechanical transfer lift, shower/bath chair, toileting accessories, transfer board, wheeled bath chair/commode, time management aids, specialized spoons for self-feeding, bathtub seats, etc.

Cognitive Aids

Includes cognitive software focusing on categorization, matching, association, reasoning, decision making, problem solving, memory skills, perceptual skills, talking word processing, word prediction/completion software, cognitive retraining or rehabilitation tools, etc.

Environmental Controls & Switches

Primarily electronic systems that enable someone with limited mobility to control various appliances, lights, telephone and security systems in their room, home or other surroundings. Includes Environmental Control Units (ECU), electronic appliance switches, switch mounting systems, home automation systems, signaling and alerting devices, home alarms, television adaptations, smoke alarm and telephone ringers, etc.

Home-Workplace Adaptations

Includes worksite/school/home design or modification for accessibility, architectural accommodations, structural adaptations, building/home ramps, home elevators, wheelchair lifts, pool lifts, bathroom changes, automatic door openers, expanded doorways, adapted furniture, adapted doorknobs, alternative doorbells, lowered

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counters, specially designed bath areas, etc.

Ergonomic Equipment

Low-tech assistive equipment or devices designed to reduce the likelihood of repetitive stress injuries often associated with work related situations. Includes adjustable workstations, industrial workstations, office workstations, adapted furniture, writing aids, modified seating and lighting, arm/wrist supports, back supports, etc. Does not generally include products intended to facilitate computer access and usage (see Computer Access Aids).

Hearing and Listening Aids

Products designed to assist the Deaf and Hearing Impaired. Includes assistive listening devices, hearing aids, infrared/personal amplification systems, audio/FM loop systems, FM amplification systems, TV amplifiers, TV decoders, visual signaling and alerting systems, tactile alerting systems, telephony and accessories, text telephones, TDDs/TTYs devices, adapted phones, etc. Does not generally include products intended to facilitate computer access and usage (see Computer Access Aids).

Mobility and Transportation Aids

Products that help mobility impaired persons move within their environment and give them independence in personal transportation. Includes standing/walking aids, transfer aids, stair lifts, walkers, scooters, wheelchairs and three-wheeled chairs, adapted bikes and Trikes, car seats/bed, stretchers, patient chairs, ramps, recliners, strollers, travel chairs, wheelchair trays, driving controls, seat belts, vehicle conversions, patient and wheelchair lifts, wheelchair loaders/carriers, wheelchair restraint systems, etc. Common sub-categories are:

Ambulatory Aids

Includes canes, cane accessories, crutches, walkers, walker accessories, scooters, power chairs, wheelchairs etc.

Vehicle Conversions

Includes car-top carriers, custom cars and vans, adaptive driving control, hand-controls, child restraint systems, ramps, lifts, etc.

Prosthetics and Orthotics

Replacement, substitution or augmentation of missing or malfunctioning body parts with artificial limbs or other orthotic aids. Includes splints, braces, foot orthosis, helmets, restraints, supports, etc.

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Recreation and Leisure Aids

Products that help persons with disabilities to participate in sports, social, cultural events. Includes modified sports equipment for skiing/biking/running/boating, audio description for movies, adaptive controls for video games, adaptive fishing rods, cuffs for grasping paddles or racquets, seating systems for boats, etc.

Seating and Positioning Aids

Products that provide mobility impaired persons with greater body stability, maintain upright posture, provide trunk/head support and reduction of pressure to the skin. Includes adapted and modular seating, cushions and wedges, contour seats, lumbar support seats, standing tables, positioning belts, braces, wheelchair modifications and cushions, seat lifts, bolster chairs, corner chairs, therapeutic seats, postural support hardware, postural support systems, pressure monitors, etc.

Vision and Reading Aids

Products designed to assist the Blind and Visually impaired. Includes auditory and speech output devices, reading machines, scanning/document reading systems, OCR systems, electronic book readers, talking equipment (clocks/watches, calculators, etc.), Braille devices, Braille transcription and translation devices, screen magnifier/enlarger, closed circuit television (CCTV) for magnifying documents, book holders, manual and electric page turners, large button phones, speaker phones, large print books, taped/audio books, etc. Does not generally include products intended to facilitate computer access and usage (see Computer Access Aids).

Society of Hispanic Professional Engineers
March 2009



AHETEMS

DESIGN COMPETITION

REVISION 1.032009

THEME: TBD

AHETEMS, Inc.
The University of Texas at Arlington
PO Box 19019
Arlington, TX 76019
(817) 272-1116
www.ahetems.org

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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 2009 AHETEMS Design Competition will be announced in late spring 2009

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 2009 AHETEMS Design Competition is TBD in late spring 2009.

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.

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.

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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, Friday, August 21, 2009.** 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

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

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Graphs, charts, tables and references must adhere to **APA 5th 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 29, 2009, at the SHPE Conference in Washington, DC.

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 2009 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.

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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 2009 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 product¹. 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 allowance². Each of the finalists **must pre-register** by **October 1, 2009**.

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 Thursday, October 28, 2009.

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.

¹ \$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.

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

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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.

CONTACT INFORMATION

All questions should be directed to designcomp@shpe.org.

DEADLINES

August 21, 2009	Deadline for Design Form, abstract, and draft concept paper
September 4, 2009	Peer-Review Panel sends list of finalists to AHETEMS
September 7, 2009	Acceptance notices sent to ten finalist teams 50% of design materials stipend sent to finalists Abstracts of finalists sent to SHPE Magazine
October 1, 2009	Finalists must pre-register for SHPE Conference
October 7, 2009	21-Day Deadline for airline reservations
October 14, 2009	Final Design Concept Paper Due (<i>Required to present</i>)
October 14, 2009	14-Day Deadline for airline reservations
October 16, 2009	Confirmation attendance notice sent to finalists
October 28, 2009	Finalists should arrive at SHPE Conference
October 29, 2009	Formal design competition presentation

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DESIGN ENTRY FORM

College/University: _____

Title of Design: _____

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.

Team Members (maximum of five):

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

Team Mentors (maximum of two)

Name (First, Last)

Name (First, Last)

Place of Employment

Place of Employment

Primary Email Address

Primary Email Address

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 ***

Project Name _____

Judge's Initials _____

ABSTRACT

30 Possible Points (20%)	Points Possible	Points Earned
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	
Total Score	30	

PAPER

120 Possible Points (80%)	Points Possible	Points Earned
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 th 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	
Total Score	120	

Total Score (Abstract + Paper) _____

- *Subject to change.*

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**FINAL ROUND
JUDGE'S SCORE CARD ***

Project Name _____

Judge's Initials _____

PRESENTATION/PROTOTYPE

160 Possible Points	Points Possible	Points Earned
Intent 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 working 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	
Overall Innovation	10	
Supporting Research	10	
Patent potential of product	40	
Total Score	200	

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.*