Proudly Present

Hampton Roads "Tech RAMP Competition" as part of:
"Something STEM-ulating over, under and on the Water"
April 20, 2020 at Nauticus, Norfolk VA

HR TECH RAMP 2020 Student Engineering Design Competition (Middle/High School and Colleges)

version 1-21-20

What is the HR TECH RAMP?

HR TECH RAMP is an engineering contest for regional middle school, high school and college students who will identify an engineering problem to be solved by a fabricated device, through CAD, Mod Sim and hardware prototyping, demonstrate the solution. Engineering problems and solutions can be from any industry sector: ship building, drones (air, land, sea), logistics, maritime, tourism, any hardware or materials- based business.

HR TECH RAMP's goal is to highlight STEM and grow a regional engineering talent pool, while creating relationships between High School, College and Business.

Three Categories of Competition:
1. **Middle School STEM and Engineering**
2. **High School STEM and Engineering**
3. **College STEM and Engineering**

HR TECH RAMP Collaborating Partners

The Hampton Roads Innovation Collaborative, the Governor's School of Science & Technology and the Tidewater Chapter, National Naval Officers Association (NNOA) are the collaborating partners for **HR TECH RAMP 2020**. NNOA facilitates strategic national and regional STEM partnerships.

HR TECH RAMP Structure

- The program runs **Jan - Apr 2020**. Design, prototype, test, compete.
- Design competition will be held Monday April 20th at the Nauticus in Norfolk.
- Teams will gather at the Nauticus for 4 hours to;
  - o Assemble their solution at the location.
  - o Demonstrate their solution as part of the presentation delivered to judges. Thirty minutes will be given to each team for all communications, demonstration, and Q&A.

5,000 in Prize Money per Category (Middle School, High School and College)

- Best Solution: The best concept developed to solve a business problem via engineering.
- Best Design: The best use of CAD, Mod Sim, or other emerging technologies.
- Best Build: The best use of prototyping technology (electrical, metal, wood) tools.
- Best Overall Project: The best incorporation of other award criteria (and winner of at least one).

Regional Fabrication Assistance

As required, HRIC will connect competing schools with business/technology mentors as well as prototyping/building assistance if required other than the school's resources.

Example of Tech Ramp Engineering Challenges (may be updated with new/additional challenges). Any design challenge degree of difficulty will be relative to the category (Middle School, High School, College).

1. A system to count and record the revolutions a freely rotating body.

2. A wearable system to provide auditory or tactile directions for the visually impaired to walk to a desired urban location using GPS.

3. A system to provide directional auditory awareness to an autonomous car, of emergency vehicle siren, screeching brakes, other road noises and give signals to the passenger.

4. A local air hazard warning system to detect the occurrence, severity, and diffusion of harmful pollutants in an urban setting.

5. A chemically powered vehicle to carry a specified cargo a specified distance.

6. A robotic solution to real life problems in the agricultural arena.

7. An operating solar powered home.

8. An operating solar powered vehicle.

9. A machine that uses the most complex process to complete a simple task.

10. A system to solve maritime problems.

11. A system to solve logistics problems in distribution.

12. A proposal to pursue a business-sourced problem of the team's choosing.

Regional Tech Expo Visibility

HRIC would provide space at the Regional Tech Expo for any team who would like to demonstrate their solution to the attending business audience.

Statement on Intellectual Property

With any design competition the notion may come to mind that the entry can be patented and/or commercialized. All individuals, groups and organizations participating in HRIC's Tech Ramp certify that their contest entries are original works and do not contain any elements that violate any third party's copyright, trademark or other intellectual property rights. The participants accept all responsibilities arising from any breach of intellectual property rights relating to their entries, and shall indemnify HRIC, its agents and partners and competition organizers against any claims and liabilities arising from any such breach. HRIC claims no property rights in and to the designs and submissions other than for the purpose of exhibition and administration of the Tech Ramp Competition. By participating in the Tech Ramp Competition, you acknowledge and agree to the terms and conditions established by the organizers.

Statement on Insurance and Liability

All school teams are expected to be insured allowing participation in the competition at the off-site location. HRIC assumes no liability or responsibility for any related activity and is acting only as the coordinator. By participating in Tech Ramp, you acknowledge and agree to these terms and conditions and release the Hampton Roads Innovation Collaborative from any liability or responsibility for any injury.

Tech Ramp Judging Criteria

Judges will have a detailed scoring rubric with descriptive words for each level of achievement under each competition criterion, per classical rubric design.

Design Process (80%)

The team has maintained an engineering design notebook to record and demonstrate that they have:

1. Defined clearly the engineering problem to be solved or new opportunity to be created.
2. Performed thorough and adequate research of potential end-user needs and preferences to identify the most important product design characteristics, constraints, and performance specifications.
3. Created multiple alternative solutions to the chosen problem or new opportunity, having studied and learned from existing designs, methods, and applications.
4. Chosen and implemented the best solution among the alternatives using appropriate engineering decision making tools.
5. Measured, collected, and analyzed critical performance data at every design iteration, demonstrating continuous improvement and refinement of the prototype design.
6. Provided adequate and well-supported justification for end-user requirements that were not modeled or tested in the prototype design.
7. Provided a full description of the final product that included consideration of health, safety, and environmental concerns and regulations; sustainable manufacturability; applicable industry standards; and other design requirements and constraints, to assure the marketability of the final product.

Design Presentation (20%)

The team has used visual presentations, computer displays, and individual team member interviews to demonstrate that they have:

1. Provided a clear and complete presentation of their prototype design process and methodologies.
2. Communicated persuasively the merits of the final product and the process to be followed to achieve it.

The presentation will include a table on which the team will provide:

1. A standard 36 x 48 tri-fold poster that displays:
   a. Project name, team (school) name, and student names with grade levels
   b. Problem statement or opportunity proposal
   c. Engineering Design Process
   d. Samples of performance data
   e. Final Product Description
2. A running computer slide presentation of the design process, including, for example, narratives, photographs, drawings, data displays, videos, etc.
3. The prototype design with opportunity for hands-on performance demonstrations.

How to Enter a Team – 2 Step Process

Step 1: *Register at https://somethingstemulating-techramp.eventbrite.com*

Step 2: *Do Step 1, Then Select Tech Ramp Competition registration option as an add-on*

Let's have a great competition!

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The Hampton Roads Innovation Collaborative (HRIC), is one of ten technology councils in the commonwealth of Virginia. Originally formed in 1996 as a 501(c)6 nonprofit, the Hampton Roads Technology Council (HRTC) now HRIC, is solely focused on advancing technology business in the Hampton Roads region.