BARN Summer Robotics Program

Purpose:
To provide an experience where a mentor/instructor guides students through a design and build program while explaining the reasons for and consequences of all of the things that take place.

Lead Instructor:
Paul G. Vibrans P.E., a Naval Architect, Marine Engineer and Electrical Engineer with 45 years of diverse engineering experience from gorilla doors to custom yachts to elevators.

2017 Project:
Design and build an advanced shooter system that that can be installed on Spartronics HELIOS before Girls Generation 2017 to allow shooting fuel from the nearest hopper into the high efficiency goal during autonomous.

Program overview:
Class work and shop work where a mentor/instructor guides a group of students through an engineering project that includes the following elements:

- Problem definition
- Recognition of design constraints
- Analysis of solution options
- Choice of solution
- Solution design
  - Geometry
  - Mechanisms
  - Speed & Power
  - Controls
  - Material Selection
- Production Planning
  - Part drawings
  - Fabrication plan
  - Fixture drawings
  - Test plan
- Part Production
- Product Assembly
- Product Testing
  - Test equipment setup
  - Test execution

Location:
All instruction, fabrication and assembly will take place at the Bainbridge Artisan Resource Network (BARN) facility at 8890 Three Tree Lane NE, Bainbridge Island, WA.

There are a number of classroom and instructional spaces that will be used for lectures and design work, depending on the size of the class. After drawings are complete, parts will be manufactured in the Metal Arts studio and the Electronic and Technical Arts studio.

Schedule:
Meetings will be held two days per week for two hours per day. Meetings will be Thursday afternoon from 2:00 to 4:00 PM and Saturday morning from 9:00 to 11:00 AM. The program will start on Thursday, June 29, 2017. The program will end on Thursday, August 31, 2017. There will be no classes on Saturday, July 22, 2017.

The schedule may be changed if required to accommodate a majority of participants as long as schedule changes do not conflict with other BARN programs. Because the class occurs during school summer vacation, 100% attendance is not required. Students who miss meetings will need to make their own arrangements to find out what they missed.

Who Should Participate:
Anyone who: (1) wants to share the experience of a Professional Engineer with a background in machine design (among other things) tackling a moderately complex design project, (2) wants to have the robot design and build experience without the stress of the FIRST Robotics build season, (3) wants to improve their skills for making parts and assemblies typical of a FIRST robot, (4) wants a refresher course on systems engineering.

Age Limit:
Students shall have completed 8th grade and one year of algebra. Knowledge of geometry and trigonometry will be extremely helpful.

Cost:
There is a non-refundable program fee of $100 due upon registration with BARN and before Thursday, June 29, 2017, for use of BARN facilities during the scheduled Robotics Program. Use of BARN facilities outside scheduled Robotics Program times requires a separate BARN student membership. There will be a $20 materials fee payable to the instructor at the start of class on Saturday, July 15, 2017.

Required Equipment and Personal Supplies:
Students will be performing calculations for the mentor/instructor so a scientific calculator will be required. The calculator feature of an iPhone 6 is satisfactory; a purpose designed scientific calculator is better.

Students will be creating sketches so suitable paper, pencils, erasers, scales, triangles and a compass will be needed at times. BARN has two computers with Autodesk Fusion 360 installed and available for use if others don't get there first. Students are encouraged to use their own laptop computers for sketching and drawing using CAD.

Registration:
Registration is in two parts. First, indicate your interest in the program by sending an e-mail with your name and school grade (9, 10, 11, 12, etc.) to <pvibrans@tscnet.com>. Second, navigate on the internet to <https://bainbridgebarn.wildapricot.org/event-2553516>, click on the rectangle marked "register," then follow the directions to register with BARN.