

## **Process for Companies to Engage as Project Proposers and Mentors for the University of Maryland Institute for Systems Research (ISR) Undergraduate Hands-On Systems Engineering Projects Capstone Course (ENES489P)**

**About ENES489P:** This hands-on design projects course exposes senior-level undergraduate and graduate-level students from all areas of engineering to exciting career opportunities in the systems engineering field.

Students get introduced to the technical aspects of systems engineering practice through team-based project development and a systematic step-by-step procedure for product development that includes working with a real-world customer to define operations concepts, requirements gathering and organization, synthesis of models of system behavior and system structure, functional allocation to create system design alternatives, formal assessment of design alternatives through tradeoff analysis, and established approaches to testing and validation/verification.

During the last three years, 146 students from across the Clark School of Engineering have completed ENES489P. ISR anticipates that the registration will increase to 80 or more students each year.

**Purpose of a company's participation:** ISR recognizes that its students receive maximum benefit from their ENES489P experience when their projects address real-world problems for real-world customers and have working engineers as mentors. A company would:

1. Provide a real-world non-proprietary problem or problems for a student project team or teams to address during this one semester course. Each team has 3-5 students. The company's engineer(s) would interact with the students as the "customer" for the problem solution, mentor the students as they develop the solution, and act as an evaluator of the work in concert with the instructor in a simulated design review; or
2. Given projects that the students have defined, the company would become the "customer" for a project it selects, mentor the students as they develop the solution, and act as an evaluator of the work in concert with the instructor in a simulated design review.

**Benefit to a company:** ISR sees three benefits to a company's participating in ENES489P: 1) Gain exposure to the application of Model-Based Systems Engineering (MBSE) as proposed by the University of Maryland; 2) Introduction to engineering students as they work through a real-world problem; a far better way to "interview" and influence prospective employees and interns; 3) fulfill a national goal of ensuring that the US produces STEM graduates that see a valuable career in the sciences, technology, and engineering.

**Obligations:**

This table states the obligations of the ISR and the company:

<b>ISR</b>	<b>Company</b>
<ol style="list-style-type: none"> <li>1. Each semester, establish an ENES489P student project team for each acceptable problem provided by the company</li> <li>2. Collaborate with the company engineers to ensure that the problems will garner student interest and match the course objectives</li> <li>3. Establish a schedule for company engineer(s) participation with students (e.g., project reviews akin to customer problem presentation/customer interviews, final design review)</li> <li>4. Provide a means for the company and students to communicate at times and places commensurate with company engineers' and students' schedules</li> <li>5. Publicize company participation through the ISR website, other websites, and public information releases.</li> <li>6. Work with the company to establish a forum for students to publish or present their work</li> </ol>	<ol style="list-style-type: none"> <li>1. Pose one or more real-world problems for ENES489P student project teams at the beginning of the Fall and Spring semester</li> <li>2. Collaborate with the instructor(s) to craft the problems to ensure the best response from students and match the course objectives</li> <li>3. Assign a permanent team (one or more individuals) of company staff members to act as the customer for each project; visit the project team 3 to 4 times during the semester (documented in the project schedule) as well as be available via email or phone to answer questions.</li> <li>4. Ensure that company team(s) satisfy its/their role in the student project(s)</li> <li>5. Provide visits of the student project team(s) to the company to learn more about the company and the real working world</li> <li>6. Make best effort as appropriate and within resource and contract constraints, to offer internships or permanent employment to students</li> <li>7. Work with ISR to establish a forum for students to publish or present their work</li> </ol>