

# John S. Baras

[Home](#) | [Research Interests](#) | [Publications](#) | [Presentations](#) | [Teaching](#) | [Students](#) | [General](#)

[Home Page for Teaching](#)  
[List of Current Courses](#)  
[List of Past Courses](#)

[home](#) / [teaching](#) / [ENEE 469P](#) /

## ENEE 489P - Special Topics in Engineering Hands-On Systems Engineering Projects

### Instructors

Professor Mark A. Austin and Professor John S. Baras

### Lecture

Tuesdays, 3:30–4:45 p.m. in CSIC 2107

### Lab

Thursdays, 3:30–6:00 p.m. in the Systems Engineering and Integration Laboratory, 2250 A.V. Williams Building

### Credits

3 credits

### Class limit

20 students

**Learn more!** <http://www.isr.umd.edu/~austin/enes489p.html>

### Would you like to understand...

- How to master system complexity?
- How to build systems to meet time and budget requirements?
- How to build systems that can be easily verified and validated?
- How to control risk?
- How to design safe systems?

This course will be a great opportunity for senior-level undergraduates and graduate students in all engineering disciplines. You'll get the chance to work in teams on hands-on, complex systems design in collaboration with industry and government experts. Be among 10 select groups in the country to be introduced to the new area of systems engineering. Systems engineering is rapidly developing as a much-sought-after career path for engineers of all kinds and is proven to be a critical factor for U.S. competitiveness. Get ahead and get introduced to the emerging model-based systems engineering discipline!

**Goals.** This hands-on design projects course will expose senior-level undergraduate and graduate-level students from all areas of engineering to exciting opportunities in the systems engineering field. Students will be 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. For the 2010-2011 academic year, project work will be driven by three product development projects provided by the Army Research Laboratory and Aberdeen Proving Ground: Product 1: Black box for Army Transport Vehicles, Product 2: Integrated Security of Wireless Sensor Networks, and Product 3: Integrated Vehicle Bus Architected for Army Transport Vehicles.

Course Contents. The course will consist of lectures and hands-on project development in the laboratory. The lecture topics to be covered include:

- Systems Engineering in Mainstream US Industry
- Models of Systems Engineering Development
- Economics of System Development
- Strategies of Systems Engineering Development
- Foundations of Model-Based Systems Engineering
- Modeling Abstractions for System Behavior and System Structure
- Introduction to Languages for Visual Modeling of Systems (e.g., UML and SysML).
- Requirements Gathering and Organization
- Requirements Allocation and Flowdown
- Requirements Traceability
- Functional Allocation to Create the System-Level Design
- Simplified Approaches to Tradeoff Analysis
- System Implementation, Testing, Validation and Verification

**Guest lectures** will also be given by Systems Engineering Professionals from industry and government labs. The laboratory work will include working with a real-world customer (industry and government experts) to define the project operational concepts and requirements, formulation of visual models, and formulation of design alternatives suitable for tradeoff analysis.

**Evaluation.** Student assessment will correspond to a mixture of short tests and a mid-term exam, plus a series of presentations (project updates) initially to members of the class, but finally to a much wider community. 25% of the grade will be based on feedback and assessment from industry and government experts.