

**MAE 434W/435**  
**Senior Design Project Fall 2014 - Spring 2015**

<b>Title:</b>  A Solid-State Fully-Active Smart-Material Based Prosthetic Arm	
<b>Description:</b>  <p>This is a multi-disciplinary project based on the design, analysis and testing of a solid-state smart material based prosthetic arm. Electrical (EE) and Mechanical (ME) Engineering students will work together in a multi-department senior design team.</p> <p>The students will utilize a piezoelectric sensor to control a shape-memory alloy actuated solid-state prosthetic device. The prosthetic device will consist of solid-state smart-materials and will not have any conventional mechanical devices such as motors, linkages or gears. The students will design, fabricate and test several different iterations of the structure as well as power/sensing electronics and control algorithms. This project will complement current research within the medical field.</p> <p>No specific subject background required, however students should be comfortable with design and analysis software (MatLab, Mathematica, Ansys, Solid Works, AutoCAD or other CAD packages, LabView, etc.), simple analog and digital electronics (resistors, capacitors, op-amps, microcontrollers, simple wiring, etc.), fabrication techniques (bonding, vacuum bagging, manual fabrication, etc.). Most importantly, the team members are expected to have an exceptional work ethic and dedication to the project. Students having a high course load in their senior year should consult the project advisor before applying.</p> <p>Please contact the project supervisor to arrange a tour of the Smart Systems Laboratory and to see existing prototypes from the previous team.</p> <p>[ <a href="http://odu.edu/mae/research/ssl">http://odu.edu/mae/research/ssl</a> ]</p>	
<b>In Collaboration with:</b>  ECE Department	
<b>Number of students needed:</b>  4 – 6 from each department	
<b>Suggested by (Faculty):</b>  Dr. Bilgen	<b>Supervised by (Faculty):</b>  Dr. Bilgen