

The School of Engineering and Technology comprises the following disciplines:

- Computer Engineering
- Electrical Engineering
- Electrical Engineering Technology
- Engineering Management
- Industrial Technology
- Manufacturing Engineering Technology
- Mechanical Engineering

All of the senior engineering and technology bachelor's students at Lake Superior State University are required to complete a challenging senior design project.

The students work in multidisciplinary teams and use a composite of their technical and general education courses to successfully complete these projects.

The intention of the senior design project is to provide valuable engineering experience that will help the team members transition well from academia to industry or graduate school. Each project requires a detailed technical engineering analysis, development and follow-through to provide a realistic experience for our graduates. Projects are typically industrial in nature. Some allow for opportunities to break ground and be a part of a new process or product warranting a patent. Others provide opportunities for presentations at conferences and/or competition participation.

Students work with timelines, monetary and management issues, communication, teamwork, paperwork, and logistics within their teams. In addition, they handle guidelines, design reviews, development and production issues, purchasing, changing project definitions, and lessons learned as they work with their faculty advisors and industrial customers.

The LSSU Product Development Center (PDC) is an extension of the College of Engineering, Technology and Economic Development. It provides the necessary engineering design tools, engineering staff, materials analysis, product packaging guidance, software development and other similar services leading to the development or testing of a functioning prototype to meet the needs of the Michigan Economic Development Center, the Michigan Small Business Technology and Development Center, and small businesses and entrepreneurs of Michigan while providing opportunities for students to obtain experience on actual design projects.

www.lssu.edu/pdc

Welcome to the Engineering Senior Project Presentations & Demonstrations

Presentations are held in CASSET 212

- 1:00 p.m.**
Presentation: Team RSS
- 1:30 p.m.**
Presentation: Team SI
Demonstration: Team RSS in CAS125
- 2:00 p.m.**
Presentation: Team ISS
Demonstration: Team SI in CASSET 124
- 2:30 p.m.**
Presentation: Team VIPERS
Demonstration: Team ISS in CASSET 119
- 3:00 p.m.**
Presentation: Team PT
Demonstration: Team VIPERS in CASSET 122
- 3:30 p.m.**
Presentation: Team PRS
Demonstration: Team PT in CASSET 106C
- 4:00 p.m.**
Demonstration: Team PRS in CASSET 122

Students will be available throughout the afternoon for informal demonstrations and questions.

2010-11 Senior Projects Faculty Board Members

This group serves as advisors, overseers, and guides to help the teams through their overall processes:

Jon Coullard, Jim Devaprasad (chair),
Robert Hildebrand, Andrew Jones, David McDonald,
Sai Nudurupati and Paul Weber

Special thanks to Cheri "Mom" Skinner



*For more information about LSSU's
School of Engineering & Technology,
contact the office at 906-635-2207.*

  www.lssu.edu/eng



The School of Engineering & Technology

presents the

Class of 2011 Senior Design Project Presentations & Demonstrations



The new Staübli robotics workcell at LSSU was the result of a double-team senior project effort in 2009-10.

Friday • April 29, 2011
1:00 p.m. - 5:00 p.m.
in the
**Center for Applied Science
and Engineering Technology**



Project: Concentrated Photovoltaic Module
Team Members: Ken Casperson, Chris Fill, Mike Gearing, Ray Greensky, and Kevin Lidbeck
Faculty Advisor: Dr. Paul Weber
Project Sponsor: 3M
Industrial Customer Contact: Mr. Tim Hebrink

Presentation: 2:00 p.m., CASET 212
Demonstration: 2:30 p.m., CASET 119

Team ISS designed, constructed, and tested a new prototype Concentrated Photovoltaic (CPV) array, based on a patent held by 3M, and developed by their Corporate Research Process Lab. The prototype uses stationary PV panels and articulated mirror panels to achieve an increased concentration of sunlight upon the PV panels. This enables the system to generate nearly equivalent power to conventional photovoltaic arrays while using fewer actual PV panels, commonly the most expensive part of any solar array. The team's solar power conversion solution is potentially more cost-efficient than currently available technology, and demonstrates the successful application of the new 3M brand Cool Mirror Film to prove its usefulness to potential customers.



Project: PDC Projects & LSSU Lab Refurbishment
Team Members: Adam Ball, Sean De Carlo, Mark Rodriguez, and Steven Solack
Faculty Advisor: Dr. Robert Hildebrand
Project Sponsor: Lakes Superior State University and the LSSU Product Development Center
Industrial Customer Contacts: Mr. Eric Becks, Mr. David Leach, Dr. Mansoor Janjua, and Dr. Sai Nudurupati

Presentation: 3:00 p.m., CASET 212
Demonstration: 3:30 p.m., CASET 106C

Team ProtoTech used its resources to develop prototype devices for several of the Product Development Center's clients in addition to refurbishing the School's thermal-fluids laboratory. Tasks included research, development, troubleshooting, construction and evaluation of custom and proprietary parts and systems. The projects made full use of the team's diverse knowledge base of in-depth mechanical and electrical design work.



Robotic Simulation Services

Project: Virtual Commissioning of Automated Workcells
Team Members: Jonathan Mitchell, Philip Nicholson, Jamie Randolph, and Derek White
Faculty Advisor: Dr. Sai Nudurupati
Project Sponsor: EOS, Rochester, Mich.
Industrial Customer Contacts: Mr. JP Rasaiah and Mr. Brent Kemmer II

Presentation: 1:00 p.m., CASET 212
Demonstration: 1:30 p.m., CASET 125

The team collaborated with EOS, an engineering consulting firm, to develop automated virtual workcells using two Virtual Commissioning Software packages: Dassault Systemes' *DELMIA Automation* and Siemens' *Process Simulate*. These packages validate the application of control systems in manufacturing and have the potential to revolutionize automated systems simulation. The workcells developed by Team RSS will be used as a demonstrational tool and highlight communication between components, data collection and dynamic response of the workcells.



Steering Innovations

Project: Electronic Steering Column Clamping System
Team Members: Kyle Finlan, Jody Gillespie, Ben Kurth, Cory Lynch, and Andrew Moran
Faculty Advisor: Prof. David McDonald
Project Sponsor: Nexteer Automotive, Saginaw, Mich.
Industrial Customer Contacts: Fred Berg, David Harris, and Adam Pfenninger

Presentation: 1:30 p.m., CASET 212
Demonstration: 2:00 p.m., CASET 124

Team SI was tasked to optimize and build an electronic clamping module prototype. The system unlocks and locks a steering column allowing the user to adjust the position of the steering wheel and column with just the push of a button. The result is a module that is smaller and more cost effective than the original prototype. An add-on feature includes a wireless remote to actuate the system that will be available for an aftermarket version of the module.



Project: Vermilion Point Project
Team Members: Brad Ekin, Eric Hoxie, Jameson Mattice, John Preczewski, and Ben Martin
Faculty Advisors: Dr. Andrew Jones
Project Sponsor: Little Traverse Conservancy (LTC)
Industrial Customer Contact: Mr. Charles Dawley

Presentation: 2:30 p.m., CASET 212
Demonstration: 3:00 p.m., CASET 122

Team VIPERS undertook the first phase of a 10-year project for Vermilion Point, located west of Whitefish Bay in Michigan's Eastern Upper Peninsula for the non-profit land trust company, Little Traverse Conservancy. The main goals were establishing a communication infrastructure and an energy assessment. The team installed a weather station, constructed a communication network, and proposed an alternative energy solution to LTC for future phases of the project.



Senior Directed Project: Upgrade of SAE Mini Baja Transmission
Project Completed & Presented by: Steve Wilson
Faculty Advisor: Mr. Jon Coullard
Project Sponsor: Lake Superior State University
Industrial Customer Contact: Prof. Paul Duesing

Presentation: 3:30 p.m., CASET 212
Demonstration: 4:00 p.m., CASET 122

PRS was given the task of designing and building a more robust transmission incorporating stronger chains and heavy duty sprockets, and redesigning the chain tensioning system of the SAE Mini Baja vehicle. The vehicle required greater durability for the harsh conditions of competition which includes hill climbs, mud bogs and rock crawls. The result is a transmission that requires less down time for repairs, providing a more competitive vehicle.