

The School of Engineering and Technology is comprised of 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 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.

LSSU PDC **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 MEDC, the MI-SBTDC, 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 CASET 212

1:00 p.m.

Presentation: Team DRIVE

1:30 p.m.

Presentation: Team AIR
Demonstration: Team DRIVE in CAS106A

2:00 p.m.

Presentation: Team II
Demonstration: Team AIR in CASET 125

2:30 p.m.

Presentation: Team PAS
Demonstration: Team II in CASET 124

3:00 p.m.

Presentation: Team MTD
Demonstration: Team PAS in CASET 125

3:30 p.m.

Presentation: Team FIRE
Demonstration: Team MTD in CASET 119

4:00 p.m.

Demonstration: Team FIRE in CASET 203

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

2009-10 Senior Projects Faculty Board Members

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

Eric Becks, Jon Coullard, Ron DeLap,
Jim Devaprasad (chair), Robert Hildebrand,
Andrew Jones, Jeff King,
David McDonald 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*

or visit us online at

www.lssu.edu/eng



The School of Engineering & Technology

presents the

Class of 2010 Senior Design Project Presentations & Demonstrations



Two of 2009's seven senior project teams... Team RTI (above) went on to finish in the top 25 of the SAE Baja Oregon while Team SPD (left) assisted with PDC prototypes. Members of all the teams have gone on to successful careers or graduate school.

Friday • April 30, 2010
1:00 p.m. - 5:00 p.m.
in the
**Center for Applied Science
and Engineering Technology**



AUTOMATION INNOVATION RENOVATION

Project: Robotic Automation Flow Line - Electrical

Team Members: Devon Clark, Greg Kaiser, Brian Lucatch, Robert F. Penrose IV and Dereck Wonnacott

Faculty Advisor: Prof. David McDonald

Project Sponsor: Lake Superior State University

Industrial Customer Contact: Mr. Jeffrey King

Presentation: 1:30 p.m., CASET 212

Demonstration: 2:00 p.m., CASET 125

Team AIR partnered with Team PAS to design and implement a robotic automation flow line in LSSU's robotics lab. The team designed the layout of the electrical, communication, and PLC panels for the four-robot system. The design included an upgrade to a centralized electrical disconnect to improve safety in the lab. Some major responsibilities included the electrical design and integration of all systems, conduit and wiring, robot and PLC programming, and vision system design and installation. Automated assembly of model zambonis will be demonstrated.

DYNAMIC RESPONSE INTEGRATION FOR VEHICLE ENGINEERING



Project: Tunable Vibroacoustic (NVH) Coupler

Team Members: Chris Bach, Greg Elsaesser, Ian Moore and Luke Quinn.

Faculty Advisor: Dr. Robert Hildebrand

Project Sponsor: American Axle, Detroit

Industrial Customer Contacts: Mr. Bill Braun and Mr. Giovanni Rinaldi

Presentation: 1:00 p.m., CASET 212

Demonstration: 1:30 p.m., CASET 106A

Team DRIVE upgraded a test stand used by its customer, American Axle & Manufacturing (AAM), to validate the vibration performance of their automotive drivetrains. Essentially, the upgrade provides a coupling device used in the test stand between the drive motor and a tested drivetrain. The device will permit the realistic testing and validation of the tested drivetrains in the absence of the rest of the vehicle machinery.

FUTURE INNOVATORS OF RAILROAD ENGINEERING



Project: Remote Train Coupler System

Team Members: Skylar Clark, Tom McGrail, Nathan Parker, Patrick Reed, Justin Storie

Faculty Advisor: Dr. Andrew Jones

Project Sponsor: Lake Superior State University

Industrial Customer Contact: Mr. Paul Duesing

Presentation: 3:30 p.m., CASET 212

Demonstration: 4:00 p.m., CASET 203

Team FIRE designed and constructed a scale prototype coupler for two variants of "O" scale model railroads. The system allows remote controlled coupling and uncoupling of railroad cars at any location through wireless communication. The design includes a coupler locking mechanism and a method to miniaturize the mechanism to operate on the smaller "HO" scale. It is the second phase of a two-year project with a patent pending



Project: Automated Robotic Work Cell

Team Members: Brett Allossery, Mark Brown, Graham Tomkins, Jonathan Valley, Devon Vogt and Jake Weinmann

Faculty Advisor: Mr. Jon Coullard

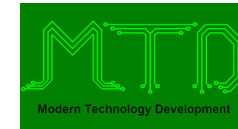
Project Sponsor: Precision Edge Surgical Products Co.

Industrial Customer Contacts: Mr. Duke Pepin and Mr. Joel Diemer

Presentation: 2:00 p.m., CASET 212

Demonstration: 2:30 p.m., CASET 124

Precision Edge Surgical Products Company manufactures surgical drills. These undergo a laser etching process to mark them with lot numbers, company logo and depth lines. Team II constructed an automated robotic work cell to load and unload a laser etching machine. This eliminates the need for a worker to be present, and increases the overall throughput of the etching process. The work cell can be easily converted to the manual mode to allow an operator to etch a small batch of parts or perform quality control checks.



MODERN TECHNOLOGY DEVELOPMENT

Project: Product Development Projects

Team Members: Brian Reid, Joshua Huddle, Sean Wonch, Amanda Hall and Ryan Newill

Faculty Advisors: Mr. Eric Becks, Dr. Ron DeLap and Dr. Paul Weber

Project Sponsor: LSSU Product Development Center

Industrial Customer Contacts: Mr. Eric Becks and Mr. David Leach

Presentation: 3:00 p.m., CASET 212

Demonstration: 3:30 p.m., CASET 119

Team MTD designed, developed, fabricated, assembled and tested a prototype anti-thrombosis device, in collaboration with LSSU's Product Development Center (PDC). This device was a redesign of a previous senior project/PDC prototype for Dr. G. Chandran, of the Cardiovascular Research Institute of Albuquerque, New Mexico. It uses a new technique to prevent blood clots in the legs of non-ambulatory patients. The design requirements included small size, low power, low noise, and precision timing of events to ensure optimum performance.



PRECISION AUTOMATED SYSTEMS

Project: Robotic Automation Flow Line - Mechanical

Team Members: Drew Dewit, Jason Fall, Ryan Kruger, Wes Moilanen and Brandon Roy

Faculty Advisor: Prof. Jim Devaprasad

Project Sponsor: Lake Superior State University

Industrial Customer Contact: Mr. Jon Coullard

Presentation: 2:30 p.m., CASET 212

Demonstration: 3:00 p.m., CASET 125

Team PAS, in partnership with team AIR, has designed and implemented a 4-robot automation flow line in LSSU's robotics lab. The line consists of four Staubli industrial robots, a PLC with DeviceNet, a conveyor system, four vision systems, robotics tool changers, end of arm devices, and several other flow line sensors and components. The team selected and integrated a pallet conveyor system, designed and manufactured end-of-arm tooling, installed and integrated components, and provided PLC programming. Automated assembly of model zambonis will be demonstrated.