

IIE REGIONAL STUDENT CONFERENCE DISTANCE DESIGN & PROTOTYPE PROJECT

Project Sponsor / Client: SDSM&T INDUSTRIAL ENGINEERING DEPT

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Project Term: Spring 2013 – Fall 2013

SDSM&T Project Program: Industrial Engineering & Engineering Management

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Project Overview:

The IIE Student Chapter from the Industrial Engineering Department of the South Dakota School of Mines & Technology hosts the IIE Regional Student Conference approximately once every five years. The last time SDSM&T hosted the conference was in 2009, and if the conference cycle continues, the IIE Student Chapter would need to prepare for hosting the conference in the Spring of 2014.

One of the recent concerns with prior conferences is that only a few students from each chapter come to the conference with the intention of presenting a conference paper. A potential enhancement to the conference would be the design and development of a way to allow virtual teams of students (a student team would consist of persons from different regional schools) to use the resources from each school to design and produce a product that would be assembled at the SDSM&T conference. This may require the reconfiguration of the laboratory equipment in the new Manufacturing Inductive Learning Laboratory (MILL) while permitting ergonomic wheel-chair access to the production equipment. The proposed Americans with Disabilities Act compliant system would potentially be competitive in the NISH Ability One competition.

For the Distance Design and Prototype Project, the following deliverables are sought:

- Identification of an interesting product that might be designed and produced using capabilities from distant schools.

- Identification and development of specifications that may require reconfigurable laboratory equipment, including the provisioning of quick change interfaces for electric, pneumatic, and data communication utilities.
- Proposal of a cost-effective system for competitive production using existing laboratory equipment – some at distant schools.
- Prototyping and testing the designed distance processes for correct performance within the conference time frame.

Student project team members will research existing production systems available within the region and design/adapt these for testing. They will capture relevant data and develop guidelines for regional team formation and project submission.

Project Background:

In the very recent past, students from the Industrial Engineering Department at the South Dakota School of Mines & Technology have finished at or near the top of the nation in the NISH / Ability One competitions. Recently, too, there have been wheel-chair bound students at SDSM&T that have needed special accommodations to enable them to perform required laboratory activities in pursuit of their degrees. As a military-friendly institution, SDSM&T sees this design as a priority.

The Industrial Engineering Department has recently moved to expanded lab space at 520 Kansas City Street and intends to combine the former Operational Strategies and Computer-Integrated Manufacturing laboratories into a single, shared, Manufacturing Inductive Learning Laboratory. It will be necessary to quickly reconfigure equipment within the MILL to allow the sharing, and the results could be used to develop a patentable product or an excellent conference paper.

Project Team Requirements and Deliverables Description:

This project will require a team of approximately four senior design students. The following deliverable items are expected for this project:

Identification of ADA/Wheelchair Accessibility Needs – research current ADA standards, and identify best practices and concerns for wheelchair-bound operator access.

Identification of reconfiguration interfaces – research current products for positioning and moving production equipment, including consideration for utility distribution.

Develop a proposal for a prototype system – integrating the results of the ADA and reconfiguration research, develop a proposal for the design and prototype development of an integrated system.

Prototype Development – Construct and implement a prototype system on at least one piece of production equipment within the existing MILL lab.

Prototype Testing – Exercise the developed system in the existing lab.

These items are expected within the time frames and along with the other deliverables described in the Industrial Engineering and Engineering Management Senior Design Projects document. That document provides a more complete description of the process, deliverables, and timing of SDSM&T IEEM Senior Design Projects.