

Senior Capstone Projects

Spring 2011

Project A: PLC Controlled Conveyor Design and Implementation

Contact: Greg Merchant,
Computer Integrated Manufacturing Laboratory Coordinator
Montana State University

Description: The goal of this project is to make the PLC-controlled Bosch conveyor system located in 115 EPS operational for a new course that will begin in Fall 2011. The project scope includes replacing the existing Omron controller with an Allen-Bradley 500 series controller; and ensuring the integrity of all electrical connections between the PLC and sensors, conveyor motors and lifter motors. Next, the team will evaluate the capability of the existing hardware to support the PLC unit of a future computer integrated manufacturing laboratory. They will then design a suitable configuration for the conveyor system to support existing educational objectives and future expansion, including specification of additional hardware as appropriate. Finally, the team will design three PLC programming problems utilizing the system and demonstrate one or more solutions to each problem, all with suitable documentation. This project may also include integration of the two ER-9 robot arms.

Team Tyler Bowman
Members: Cory Wolyson

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Project B: Design of Packaging and Installation Protocols for Novel Utility Pole Protection System

Contact: Dennis Bell, President
Grid Defender, Inc.
Philipsburg, MT

Description: Grid Defender, Inc. has developed an innovative utility pole protection system that promises to greatly diminish the financial costs and risks associated with natural disasters. The economics of packing, delivering, and installing the system are key to market acceptance. Therefore, a strong need exists to develop standardized work procedures and visual work instructions for fabrication, packaging for storage compactness, staging, delivering to location, and installing on either existing or new utility poles dispersed across a geographic area. From these work procedures, the team will estimate labor content and conduct economic analyses from both the company and client perspectives. The above information will be packaged appropriately for presentation to the general public.

Team Members: Michael Bauer
Adam Gereg
Owen Kelley

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Project C: Assessment and Redesign of a Surgical Supply Management System

Contact: Shelly Satterthwait, Director
Surgical Services
Bozeman Deaconess Hospital

Description: Surgical Service holds approximately \$2M of surgical supplies in inventory. The goal of this project is to reduce the department's inventory costs by 15%. Cost savings can be realized from a combination of reduced inventory on-hand, reduced obsolescence, and simplified management systems that reduce labor. The student team is expected to assess the current inventory management system for supplies and consignment items (including, but not limited to: decisions on reorder points and quantities, inventory organization, and the workflow surrounding receiving and stocking inventory, placing replenishment orders, pulling inventory for use in the surgical suite, and charging supplies used to patient accounts). The team will then design enhancements to the system backed by engineering and economic analysis.

In addition, the team will design the layout for a new equipment storage room that will maximize space utilization and minimize staff time locating or returning a piece of equipment.

Team Allison Grubbs
Members: Nick Kintzler
David Sitek

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Project D: Horse Halter Production Operations Analysis and Redesign

Contact: Pete Melniker, Owner
Double Diamond Halter Company
Bozeman, MT

Description: Double Diamond Halter Company fabricates horse halters and other tack from stock rope, and sells them to retailers nationwide. The company owner recognizes potential improvement opportunities related to production control and inventory management. The student team will evaluate the flow of operations and existing inventory management system, then design an enhanced production control system to improve the overall efficiency and effectiveness of the shop in meeting customer demand (i.e., how and when to get orders from customer service to the shop floor, communicate to shop employees what to produce next, pack shipments, reorder inventory). Improved designs of production control strategy, physical inventory storage, the inventory management system, workstations and fixturing, and layout and flow of materials may be necessary to achieve the project objectives.

The project sponsor will be at a trade show January 10-21. Therefore the team should meet with sponsor by January 7 in order to get a good start on the semester.

Team Members: Quinn Bloom
Corey Lewis
Kole Ryan
Brett Stovall

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Project E: Going Paperless: Analysis and Implementation of An Electronic Ordering System

Contact: Julie Kindred, Clinical Coordinator
Bozeman Deaconess Hospital

Description: Bozeman Deaconess Hospital is moving towards meaningful use of electronic health records. Part of that process includes moving away from a paper-based ordering system for laboratory tests, radiology tests, and other procedures within the hospital, to an electronic system for processing orders. The MSU design team will undergo training in the electronic system the hospital will be adopting. The team will then work with three departments (likely Laboratory, Radiology, and the Therapies groups) to map the work flows in each department that will be impacted by the change. The goal is to design new work flows (and possibly new work area designs), in collaboration with department staff members and management, to seamlessly accommodate the new electronic ordering system to maximize efficiency and effectiveness while preserving patient safety as the highest priority.

Team Members: Mark Eggensperger
Erica Gordon
Matt Lovejoy

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Project F: Social Entrepreneurial Production Planning

Contacts: Mike Everts and David Fortin
Dept. of Architecture
Montana State University

Description: The Architecture department at MSU has been working with a social entrepreneur in Nairobi, Kenya, to design facilities that will produce building components for the slum areas of that city. Several of these components are multifunctional in that they provide structural support for shelter along with a means of food or revenue production. The team assigned to this project will work as IE consultants on one or more projects to design low-cost manufacturing processes for these building components, including but not limited to: equipment specification, layout, material handling, work station design. The team may also assess the viability of alternative business plans associated with that selected component(s) to develop a sustainable economic enhance venture.

Team
Members: Celena Byers
Nelson Rahn
Samantha Severin