MANUFACTURING/INNOVATION LAB: 3-D PRINTING WORKSTATION PROJECT

Project Sponsor / Client: IE DEPARTMENT / SDSM&T MIL LAB

Client Contact Information: (See Project Instructor, below)

Project Term: Fall 2015 – Spring 2016

Project Degree Programs: Industrial Engineering & Engineering Management

SDSM&T Project Instructor:
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Project Overview:

At the end of the Spring Term in 2016, the Industrial Engineering Department will be moving into the basement floor of the SDSM&T Library. In order to fit the planned equipment for the Manufacturing/ Innovation Laboratory into the allocated space, it will be necessary to redesign the 3-D Printing workstation for a smaller footprint.

The current equipment has five printers spread over a nearly 11' x 2' footprint (without operator), and has a horizontal layout. The equipment that must be accommodated includes the following:

- One MakerBot Z18 printer
- Two MakerBot Mini printers
- Two MakerBot Replicator 2 printers
- Two MakerBot Replicator 2X printers (to be added)
- At least one Fujitsu T 901 tablet computer and mouse
- Set of small drawers holding maintenance tools and materials
- Necessary hand tools for workstation operation and adjustment.

The redesigned workstation should accommodate all the items listed above, and:

- Fit an approximate 6' x 30" footprint (without operator), using a more vertical layout
- Accommodate wheelchair access
- Demonstrate improved physical and cognitive ergonomics, both for operation and for assembly/relocation
- Incorporate better filament storage and feeding operations

- Considering improved guarding and safety of operation
- Contain the appropriate electrical power systems
- Be compatible with 80/20 15 and 30 Series extrusion and fastening systems
- Be easily relocatable with respect to the laboratory location
- Be expandable to incorporate existing 3-D laser digitizer.

For this workstation project, the following deliverables are sought:

- Design and develop one or more conceptual prototype(s) demonstrating the important features and functionality prior to the end of the first term.
- Develop an appropriate bill of materials, cost estimate, and recommended supplier system prior to the end of the first term.
- Propose a feasible development plan for one or more functional prototypes prior to the start of the second term, including working design documents and initial material purchase.
- Develop appropriate design and production documentation for one or more functional prototypes by the Design Fair.
- Develop and test one or more functional prototypes before the Design Fair.
- Complete final project documentation, meeting all senior design course requirements, before the end of the second term.

Project Team Personnel Requirements and Deliverables Standards:

This project will require a team of approximately four senior design students. Software to document the processes will be selected by the student team, and may include MS Excel, MS Project, DSS SolidWorks or other appropriate and professional choices.

These items are expected within the time frames and along with the other deliverables described on the Schedule and Materials pages of the course website, and in the Industrial Engineering and Engineering Management Senior Design Projects Rubric. Those documents provide a more complete description of the process, deliverables, and timing of SDSM&T IEEM Senior Design Projects.

Website: http://jensen.sdsmt.edu/IENG464-465/