

Experiential Learning Modules for Manufacturing System and Supply Chain Designs

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Summary. The goal of this project is to develop a set of holistic and integrated course modules in "Manufacturing System Design" that will enable students, working in teams, to design and implement efficient manufacturing systems. This will be accomplished through the development of a series of experiential learning modules that will incorporate information technology and state-of-the-art research results. Students will engage in active learning and team work experiences in these modules. These new course modules can be adopted not only in undergraduate courses but also in entry-level graduate courses in Engineering and Supply Chain Management programs at Syracuse University.

Tasks to be accomplished are: (1) to adopt research results on a rapid evaluation tool for manufacturing cell configurations and a comprehensive computer-based design tool for manufacturing cells, (2) to field test these tools in the partnering manufacturing companies and within the course, (3) to incorporate these tools in the proposed course modules, (4) to develop a series of experiential learning modules which (i) incorporate the state-of-the-art research results on manufacturing system design, (ii) integrate principles, practices, and modeling knowledge at an appropriate level for student learning, (iii) provide students with opportunities to learn in teams, and (iv) use web-based instruction incorporating the latest instructional development models, (5) to utilize state-of-the-art knowledge on learning theory and curriculum development, (6) to study the effectiveness of experiential learning in this context, (7) to study the effectiveness of the rapid evaluation tool and computer based design tool, and (8) to disseminate the results of the project (both process and product) to the engineering community and education community.

The intellectual merit of the proposed activity:

As a result of this project, students will be (1) able to use tools for manufacturing system design and engineering science, (2) able to apply their personal skills to design effective manufacturing systems based on an established set of criteria, (3) better prepared than previous students to design effective manufacturing systems in a professional environment, and (4) better prepared than previous students to work collaboratively in a professional environment.

The broader impacts resulting from the proposed activity:

Incorporating these goals and objectives and the guiding principles outlined above, the relevant courses in engineering as well as business schools can employ a series of experiential learning modules through which students will work in teams to accomplish realistic design tasks for manufacturing system and supply chains. Seven experiential learning modules and corresponding lectures will be developed through close interaction with manufacturing companies in the greater Syracuse area. Therefore, any manufacturing company can also adopt a part or a whole of the seven modules for their

corporate training. Furthermore, community colleges teaching principles of Lean Manufacturing can adopt a few modules to be developed from this project.