Development of a Discrete Event Dynamic Systems Curriculum Using a Web-based "Real-Time" Simulated Factory

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In this talk, we present a web-based virtual factory that operates in "real time" and will be managed by teams of engineering students in the context of a course on Discrete Event Dynamic Systems. This project aims at an integrative and innovative approach to curriculum development that departs significantly from the current methods of teaching engineering methodology courses. The course is problem driven where industrial case studies are the basis for the introduction of problems, key concepts, and solution methodologies. The objective of developing this educational environment is to bring the complexity of real world decision making (e.g., capacity planning and design, operational decisions, supply chain management) to the classroom and to simulate the dynamics and uncertainties of organizational decision making (hierarchy of decision makers, exchange of information, teamwork) in a classroom setting. More specific objective are:

(i) to use industrial case studies to frame problems and issues in their real-world complexities and to break out of "textbook" examples;
(ii) to engage students in the solution process where individual students, or teams of students, are required to assess their options in the management of their factories, make decisions based on what they have learnt in the course and adapting it to the problem at hand, and "bear" the consequences of their decisions;
(iii) to introduce research results and approaches in a context where their significance and contributions can be best appreciated.

In the course, each student will be asked to design and operate a manufacturing system to meet certain initial specifications given a certain budget. As the system starts operating, costs/profits are incurred as a function of the system's dynamic performance. Based on the real-time feedback and also by using simple simulation and analytical tools, the student will make adjustments in the structural design, parameter settings, and operating policies.

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