I SY E 641, Design and Analysis of Manufacturing Systems

1. Credits: 3  Contact Hours: 3.8

a. Other Supplemental Materials: N/A

- Specific Course Information:

a. Brief description of the content of the course (Course Catalog Description): Covers a broad range of techniques and tools relevant to the design, analysis, development, implementation, operation and control of modern manufacturing systems. Case studies assignments using industry data will be used to elaborate the practical applications of the theoretical concepts. This course also serves as a capstone course for the MSMSE degree.

b. Pre-requisites or Co-requisites: Grads: MSE major or consent of instructor; Undergrads: IE 315 or 605, & consent of instructor

c. This is a Selected Elective course.

- Specific Goals for the Course:

a. Course Outcomes:

1. Knowledge of key drivers of manufacturing system performance, throughout the manufacturing enterprise (not just shop floor).
2. How lead time reduction can drive improvements throughout the enterprise.
3. Familiarity with common techniques and tools for manufacturing system analysis.
4. How to conduct a manufacturing improvement project (includes: how to set goals and how to get management to sign off on those goals; gathering and analyzing data; using
the right tools for analysis; deriving recommendations; presenting the recommendations
to management).

5. How to work in a team environment.

- **ABET Student Learning Outcomes:**

  (a) Ability to apply mathematics, science and engineering principles.
  (b) Ability to design and conduct experiments, analyze and interpret data.
  (c) Ability to design a system, component, or process to meet desired needs.
  (d) Ability to function on multidisciplinary teams.
  (e) Ability to identify, formulate and solve engineering problems.
  (f) Understanding of professional and ethical responsibility.
  (g) Ability to communicate effectively.
  (h) The broad education necessary to understand the impact of engineering solutions in a
global and societal context.
  (i) Recognition of the need for and an ability to engage in life-long learning.
  (j) Knowledge of contemporary issues.
  (k) Ability to use the techniques, skills and modern engineering tools necessary for
engineering practice.

- **Brief List of Topics to be Covered:**

  Introduction to modern manufacturing strategy and the importance of Quick Response
  Manufacturing. Implementing quick response in production. Structured methodology to
  conduct a manufacturing improvement project. Team Building, conducting meetings.
  Creating a goals document. Tools for manufacturing system analysis. Impact of lot sizes
  and capacity planning. MRP in the modern manufacturing context. Supplier and Customer
  Management mindset and performance measures. Steps to implementing changes and
  improvements.

- **Additional Information:** N/A