

Course Syllabus

Department: Science & Technology

Date: 01-25-2013

I. Course Prefix and Number: TECH 233

Course Name: Introduction to Process Improvement

Credit Hours and Contact Hours: 3 credit hours and 3 contact hours

Catalog Description including pre- and co-requisites:

Six Sigma techniques, introduced to industry in the late 1980's, facilitate using data driven decisions to reduce defects, drive down costs and increase efficiency. **Six Sigma** is a methodology that focuses on minimizing process variation, thereby enabling the process to operate more smoothly and efficiently. The technique uses data based decisions for process and product improvements. **Lean** is a process that focuses on eliminating waste and streamlining operations. **Lean Six Sigma**, a more recent technique combines the two processes. Data driven decisions are still present, but the emphasis on speed for the process improvement is key. Combining these two methods into Lean Six Sigma provides a powerful tool to make improvements in any business.

Prerequisites: ENG 101 and MAT 152 or placement into Math Level 4.

Relationship to Academic Programs and Curriculum including SUNY Gen Ed designation if applicable:

This course is primarily a technical elective course for the A.A.S. in Mechanical Technology program. Other students from other programs may also take the course if they have the appropriate background.

II. Course Student Learning Outcomes: *State the student learning outcome(s) for the course (e.g. Student will be able to identify...)* **The student will be able to:**

- Explain the origins and history of Lean Six Sigma
- Describe the principles of Lean. Describe why speed and efficiency are important in any processes
- Define Six Sigma
 - Define variation
 - Define why understanding variation is important in any process.
- Explain the synergy between Lean and Six Sigma

- Describe how the Lean Six Sigma process is applicable to both Manufacturing and Service.
- Demonstrate the ability to define and give examples for Voice of the Customer.
- Define the basic concepts of Define, Measure Analyze Improve, Control (DMAIC).
- Demonstrate the ability to use the DMAIC tools.
- Identify the Lean Six Sigma application process through case studies.
- Demonstrate the ability to use statistical tools.

College Learning Outcomes Addressed by the Course: *(check each College Learning Outcome addressed by the Student Learning Outcomes)*

- | | |
|---|---|
| <input type="checkbox"/> writing | <input checked="" type="checkbox"/> computer literacy |
| <input type="checkbox"/> oral communications | <input type="checkbox"/> ethics/values |
| <input type="checkbox"/> reading | <input type="checkbox"/> citizenship |
| <input checked="" type="checkbox"/> mathematics | <input type="checkbox"/> global concerns |
| <input checked="" type="checkbox"/> critical thinking | <input type="checkbox"/> information resources |

III. Assessment Measures (Summarize how the college and student learning outcomes will be assessed): *For each identified outcome checked, please provide the specific assessment measure.*

List identified College Learning Outcomes(s)	Specific assessment measure(s)
<i>eg: writing</i>	<i>eg: student will complete a research paper</i>
Mathematics (Statistical thinking)	Assignments and projects
Critical Thinking	Students will do project work to arrive at solution through DMAIC tools.
Computer Literacy	Use of Minitab Software for assignments

IV. Instructional Materials and Methods

Types of Course Materials:

- Two text books containing methods and case studies for using lean six sigma techniques.
- Minitab statistical software
- Internet websites and videos.

Methods of Instruction (e.g. Lecture, Lab, Seminar ...):

Main avenue used to convey knowledge to the student are lectures. They are presented in the traditional way, using either whiteboard or smartboard, supplemented with models, material samples, or power point presentations.

Plenty of example problems are solved in class and the students are allowed to practice the problem solutions through various homework assignments.

V. General Outline of Topics Covered:

- Be able to explain the origins and history of Lean Six Sigma
- Defining Lean and Six Sigma and how they relate
- Understand cost and defect reduction
- Understand how the Lean Six Sigma process is applicable to both Manufacturing and Service.
- Understand Voice of the Customer
- Define the basic concepts and tools of Define, Measure Analyze Improve, Control (DMAIC)
- Demonstrate the ability to use the DMAIC tools
- Understand the Lean Six Sigma application process through case studies.
- Statistical Tools and the Use of Minitab (mean, standard deviation, charts and graphs, population parameters vs. sample statistics, normal distribution, t distribution, confidence limits, hypothesis testing, ANOVA)
- Complete a case study project