PRE-REQUISITES : Statistics

INTENDED AUDIENCE : Mechanical Engineering, MBA, Industrial Engineering
INDUSTRIES APPLICABLE TO : Manufacturing and Service Industry

COURSE OUTLINE :

- The course on Six-Sigma will focus on detailed strategic and operational issues of process improvement and variation reduction. Six-sigma is a measure of quality that strives for near perfection. It is a disciplined, data-driven approach for eliminating defects (driving towards six standard deviations between the mean and the nearest specification limit) in any process-from manufacturing to transactional and from product to service.
- A Six-sigma defect is anything outside of customer specifications. To be tagged Six Sigma, a process must not produce more than 3.4 defects per million opportunities.
- Six-sigma employs a systematic approach of DMAIC (Define, Measure, Analyze, Improve and Control) for the process improvement. This course will provide a detailed understanding on various issues specific to each phase of DMAIC.
- The course is designed with a practical orientation and includes cases, industry examples and MINITAB software applications.
- The course is designed to satisfy the need of both industry professionals and University students.
- The content is beneficial to both manufacturing and service industry.

COURSE PLAN:
Week 1 : QUALITY: FUNDAMENTALS AND KEY CONCEPTS
Lecture 1: Brief overview of the course
Lecture 2: Quality concepts and definition
Lecture 3: History of continuous improvement
Lecture 4: Six Sigma Principles and Focus Areas (Part 1)
Lecture 5: Six Sigma Principles and Focus Areas (Part 2)
Lecture 6: Six Sigma Applications
Week 2 : QUALITY: FUNDAMENTALS AND KEY CONCEPTS
Lecture 7: Quality Management: Basics and Key Concepts
Lecture 8: Fundamentals of Total Quality Management
Lecture 9: Cost of quality
Lecture 10: Voice of customer
Lecture 11: Quality Function Deployment (QFD)
Lecture 12: Management and Planning Tools (Part 1)
Lecture 13: Management and Planning Tools (Part 2)
Week 3 : DEFINE
Lecture 14: Six Sigma Project Identification, Selection and Definition
Lecture 15: Project Charter and Monitoring
Lecture 16: Process characteristics and analysis
Lecture 17: Process Mapping: SIPOC
Week 4 : MEASURE
Lecture 18: Data Collection and Summarization (Part 1)
Lecture 19: Data Collection and Summarization (Part 2)
Lecture 20: Measurement systems: Fundamentals
Lecture 21: Measurement systems analysis: Gage R&R study
Lecture 22: Fundamentals of statistics
Lecture 23: Probability theory
Week 5 : MEASURE
Lecture 24: Process capability analysis: Key Concepts
Lecture 25: Process capability analysis: Measures and Indices
Lecture 26: Process capability analysis: Minitab Application
Lecture 27: Non-normal process capability analysis

Week 6 : ANALYZE
Lecture 28: Hypothesis testing: Fundamentals
Lecture 29: Hypothesis Testing: Single Population Test
Lecture 30: Hypothesis Testing: Two Population Test
Lecture 31: Hypothesis Testing: Two Population: Minitab Application
Lecture 32: Correlation and Regression Analysis
Lecture 33: Regression Analysis: Model Validation
Week 7 : ANALYZE
Lecture 34: One-Way ANOVA
Lecture 35: Two-Way ANOVA
Lecture 36: Multi-vari Analysis
Lecture 37: Failure Mode Effect Analysis (FMEA)
Week 8 : IMPROVE
Lecture 38: Introduction to Design of Experiment
Lecture 39: Randomized Block Design
Lecture 40: Randomized Block Design: Minitab Application
Lecture 41: Factorial Design
Lecture 42: Factorial Design: Minitab Application
Week 9 : IMPROVE
Lecture 43: Fractional Factorial Design
Lecture 44: Fractional Factorial Design: Minitab Application
Lecture 45: Taguchi Method: Key Concepts
Lecture 46: Taguchi Method: Illustrative Application
Week 10 : CONTROL
Lecture 47: Seven QC Tools
Lecture 48: Statistical Process Control: Key Concepts
Lecture 49: Statistical Process Control: Control Charts for Variables
Lecture 50: Operating Characteristic (OC) Curve for Variable Control charts
Lecture 51: Statistical Process Control: Control Charts for Attributes
Lecture 52: Operating Characteristic (OC) Curve for Attribute Control charts
Lecture 53: Statistical Process Control: Minitab Application
Week 11 : CONTROL
Lecture 54: Acceptance Sampling: Key Concepts
Lecture 55: Design of Acceptance Sampling Plans for Attributes (Part 1)
Lecture 56: Design of Acceptance Sampling Plans for Attributes (Part 2)
Lecture 57: Design of Acceptance Sampling Plans for Variables
Lecture 58: Acceptance Sampling: Minitab Application
Week 12 : SIX SIGMA IMPLEMENTATION CHALLENGES
Lecture 59: Design for Six Sigma (DFSS): DMADV, DMADOV
Lecture 60: Design for Six Sigma (DFSS): DFX
Lecture 61: Team Management
Lecture 62: Six Sigma: Case study
Lecture 63: Six Sigma: Summary of key concepts

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CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 6 assignments out of the total 8 assignments given in the course.
Exam score = 75% of the proctored certification exam score out of 100

Final score = Average assignment score + Exam score

YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE >=10/25 AND EXAM SCORE >= 30/75. If one of the 2 criteria is not met, you will not get the certificate even if the Final score >= 40/100.