ME723 Six Sigma Management

Open. Elec-5 (d) SIX SIGMA MANAGEMENT					
Course Code	ME723		Credits	3	
Scheme of Instructions (Hours / week)	L	T	P	TOTAL	
	3	0	0	42 hr/sem	
Scheme of Examination TOTAL = 125 marks	IA	TW	TM	IA	TW
	25	0	100	25	0

Course Objectives:

1. Exposing students to the fundamentals of Six Sigma methodology.
2. Exposing students to tools and techniques used in Six Sigma.
3. Building capability among students in mapping the organizational activities and problems in terms of six sigma framework.
4. Demonstrate ability to implement a structured approach for process, product or service improvement.

Course Outcomes:

On completing this course students will be able to:

CO1 Understand the concepts, tools, techniques and methodologies in Six Sigma Management

CO2 Apply Six Sigma concepts tools and techniques and methodologies to practical problems in service and manufacturing sectors.

CO3 Analyze real-life situations for design and continual improvement of product and processes

CO4 Evaluate cases using Six Sigma Methodologies

UNIT 1 [10 hours]

Overview of Six Sigma Management: Introduction, Successful applications of Six Sigma Management, Timeline for Six Sigma Management, Benefits of Six Sigma Management, Voice of the Process, Voice of the Customer, Nontechnical and Technical Definition of Six Sigma, Terminologies in Six Sigma Management, Overview of PDCA. Six Sigma Roles and Responsibilities: Champion, Master Black Belt, Black Belt, Green Belt, Yellow Belt, Process Owner. Data Analysis: Measures of Central Tendency, Measures of Variation, Skewness, Kurtosis, and Measurement system analysis using gauge R&R

UNIT 2 [10 hours]

Tools and Techniques used in Six Sigma: SIPOC diagram, Root Cause Analysis, Frequency distribution and Histogram, Run charts, Stem-and-leaf plots, Pareto diagrams, Cause and Effect Diagrams, Box Plots, Normal probability plots. Quality Function Deployment, Failure Mode Effect Analysis - At least two case studies.

UNIT 3 [10 hours]

Design of Experiments (DOE): Factorial designs: Introduction, Two Factor factorial (2^2) design, Three-Factor Factorial (2^3) Design, ANOVA. Numericals on 2^2 and 2^3 factorial

designs. Taguchi Method: Taguchi philosophy, Loss function, Signal-to-Noise ratio, experimental design in Taguchi Method, Parameter design.

UNIT 4 [10 hours]

DMAIC process: Define, Measure, Analyze, Improve, Control phases. Case study on DMAIC - At least one each from manufacturing industry and service industry highlighting the use of tools and techniques used in each phase. Design for Six Sigma (DFSS): Define, Measure, Analyze, Design, Verify phases. Case study on DFSS - At least one each from manufacturing industry and service industry highlighting the use of tools and techniques used in each phase

TEXTBOOKS

1 H. S. Gitlow, D. M. Levine; Six Sigma for Green Belts and Champions; Prentice Hall; First Edition; 2004
2 A. Mitra; Fundamentals of Quality Control and Improvement; Wiley; Third edition; 2013
3 D. C. Montgomery; Design and Analysis of Experiments; Wiley; Eighth Edition; 2013

RE FERENCES

1 P. J. Ross; Taguchi techniques for Quality Engineering; McGraw Hill; Second Edition; 2005
2 T. McCarty, L. Daniels, M. Bremer, P. Gupta; The Six Sigma Black Belt Handbook; McGraw Hill; 2010
3 T. Allen; Introduction to Engineering Statistics and Six Sigma; Springer ; 2008
4 J. ReVelle, J. Moran, C. Cox; The QFD Handbook; John Wiley and Sons; 1998.
5 T. Pyzdek; The Six Sigma Handbook; McGraw Hill; Eighth Edition; 2017
6 G. R. Henderson; Six Sigma Quality Improvement with Minitab; Wiley; Second Edition; 2011.
7 A. M. Roderick, J. M. Matthew, B. N. Mohamed, R. Govindarajan, J. Z. Daniel; The Certified Six Sigma Green Belt Handbook; ASQ Quality Press; 2015