Six Sigma Quality

Programme course

6 credits

Six Sigma Quality

TMQU04

Valid from: 2017 Spring semester

Determined by
Board of Studies for Industrial Engineering and Logistics

Date determined
2017-01-25

Main field of study
Industrial Engineering and Management

Course level
Second cycle

Advancement level
A1X

Course offered for
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Mechanical Engineering, M Sc in Engineering
- Industrial Engineering and Management, Master's programme
- Mechanical Engineering, Master's programme
- Energy-Environment-Management

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Required: Mathematical statistics, Quality Management and Engineering
Desired: Statistical Quality Control.

Intended learning outcomes

The course gives knowledge about organization, working methods and tools for process and product improvements using Six Sigma methodology. The essence of Six Sigma is to define and solve advanced problems using advanced statistical and qualitative methods, but doing so in a way that results and solutions are well supported by managers and employees in the organization and process being improved. The foundation is based on scientific method, but the project-oriented approach is design to fit in an engineering environment. After completing the course, the student is able to:

- identify situations where Six Sigma methodology could give an important contribution to quality improvement with regard to product and process development within industrial and service contexts
- identify which analysis methods is suitable to solve a given problem
- carry out a Six Sigma project from defined problem and target to verified improvement according to the DMAIC process
- use both qualitative evaluations and quantitative statistical analysis and improvement methods

Course content

Understanding of variation, Evolution of Six Sigma, the DMAIC roadmap for carrying out improvement projects as well as tools for the five phases:

- DEFINE - Define problem and target (but not solution)
- MEASURE - Collect facts and data (historical/real-time) and funnel the problem
- ANALYZE - Find the hidden root causes with quantitative and qualitative methods
- IMPROVE - Carry out robust and sustainable improvements
- CONTROL - Document, train, measure and follow up and finally hand over

Teaching and working methods

The course is carried out as a Six Sigma-project according to the five phases of the DMAIC process. The theoretical elements of the course are covered in lectures, one-two per project phase. All work is done on a project basis, where max four students work in a team. All teams will get the same assignment but with different data to analyze, and hence different root causes. Each team carries out a project phase per week and will be coached/guided by a teacher once a week. Each phase ends with the submission, review and approval (if necessary after completion) of a new chapter in the project report. The project work is designed as a real project, the way it is carried out in industry or other companies using the Six Sigma process improvement methodology. Furthermore, a final project presentation in a so-called poster session in front of other students is conducted in the end of the course. A literature seminar is also conducted group wise.

Examination

KTR1	Written Test	0.5 credits	U, 3, 4, 5
UPG2	Projects	5.5 credits	U, 3, 4, 5

Each team submits five report chapters (one per DMAIC phase), which together form the project report. These are graded according to U,3,4,5 based on how well the work was done by the group and how much supervision and completion they needed. Everyone in the group gets the same average grade. The individual grades may be changed based on an individual written test. The main focus is on solving the problem in the group under as close to real circumstances as possible why the group's performance is the main basis for grading.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses:
Quality Management Course. May lead to Six Sigma Green Belt certification.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Björn Oskarsson

Examiner

Peter Cronemyr

Education components

Preliminary scheduled hours: 50 h
Recommended self-study hours: 110 h

Course literature

Magnusson, K., Kroslid, D. and Bergman, B. (2003) Six Sigma The Pragmatic Approach, Studentlitteratur Brook, Q. (2010) Lean Six Sigma and Minitab: The Complete Toolbox Guide for All Lean Six Sigma Practitioners (3rd edition), OPEX Resources Ltd Utdelat material och artiklar

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.