Quality Management (F000899)

Course size (nominal values; actual values may depend on programme)

Credits 6.0　　　　　Study time 180 h　　　Contact hrs 45.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	guided self-study	2.5 h
		lecture	32.5 h
		group work	10.0 h

Lecturers in academic year 2018-2019

Goossens, Dries	EB24	lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Master of Science in Business Economics (main subject Accountancy)	6	A
Master of Science in Business Economics (main subject Corporate Finance)	6	A
Master of Science in Business Engineering (main subject Data Analytics)	6	A
Master of Science in Business Economics (main subject Marketing)	6	A
Master of Science in Business Engineering (main subject Operations Management)	6	A
Exchange programme in Economics and Business Administration	6	A

Teaching languages

English

Keywords

Quality Management Systems, Measurement system analysis, Acceptance sampling, Statistical Process Control, Process Capability, Design of Experiments, Quality Gurus, Total Quality Management, ISO 9000, Six Sigma

Position of the course

This course deals with the concepts of quality and quality systems. First, the quality of measurement systems is discussed, together with ways to quantify and evaluate the accuracy, precision, and reproducibility of a measurement system. Next, quality control is discussed: how can we decide whether a lot of items satisfies quality requirements (e.g. using inspection sampling). An important part of this course is statistical process control, which is a technique based on control charts and process capability indices used to bring the mean of important quality characteristics closer to the target, and/or minimizing the variance of these characteristics. Tools and techniques for quality analysis, assurance and control, including Quality Function Deployment and data analysis (and modelling) methods, are also discussed. It discusses the organization of quality care in industrial companies, and the steps to set up and implement a quality management system possibly integrated with existing systems (ISO, safety programs, HACCP, ...).

The graduates should be able to formulate innovative ideas in order to improve an organization's performance with respect to quality. Innovation within an organization entails 'change management' projects, and therefore, the students will get a training to learn how to support and implement changes. Moreover, a number of attitudes like working independently, creativity and critical awareness, have to be developed further.

Contents

Introduction to quality: definitions, history, cost of quality
Statistics for quality

Quality measurement: repeatability and reproducibility analysis
Quality control: acceptance sampling plans, OC curve, attributes vs. variables
Statistical process control: variation, control charts (variables/attributes): interpretation & implementation, rational subgrouping, process capability
Quality design: quality function deployment, failure mode and effects analysis, reliability, design of experiments, tolerancing
Quality gurus: Deming, Juran, Crosby, Taguchi, Shingo, Imai
Quality management systems: TQM, Six Sigma, ISO-9000
Quality certificates & prizes

Initial competences

Basic statistics prerequisite (descriptive statistics, probability, basic distributions, hypothesis testing, confidence intervals, inference). The course material includes a chapter that recapitulates the statistics relevant for this course with some exercises (self study). This offers a possibility for students with a weak background in statistics to catch up or refresh their knowledge. Please note that the focus of this course is more on engineering than on management, which requires some affinity with statistics.

Final competences

1. Be able to explain the key components of quality concepts (insight);
2. Be able to analyse research methods and techniques relevant for operations and technology management (insight);
3. Assess the quality of raw materials and finished goods using acceptance sampling (insight and application).
4. Be able to set up and analyse control charts (insight & application);
5. Be able to assess quality analyses in a production system (application);
6. Be capable to analyse and solve quality problems based on a sound knowledge of quality concepts and theories (application);

7. Be able to set up and analyse design of experiments (insights & application);
8. Be able to explain and critically reflect on quality management systems (insights & application);
9. Develop innovative ideas to improve the performance of companies (application);
10. Understand the insights of the quality guru's (insights)

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, group work, lecture

Extra information on the teaching methods

Lectures, combined with case studies. Students need to tackle a number of practice-oriented cases (group assigments).

Learning materials and price

Slides and course text are available on Minerva. No mandatory purchase of a text book; recommended literature is available in the faculty library. Estimated cost: <20 EUR.

References

A First Course in Quality Engineering (K.S. Krishnamoorthi & V.R. Krishnamoorthi, 2011) – CRC Press
Quality (D. Summers, 2010) - Pearson
Statistical Quality Control - A Modern Introduction (D. Montgomery, 2012) – Wiley
Design and analysis of experiments (D. Montgomery, 2008) - Wiley
Practical engineering, process, and reliability statistics (M. Durivage, 2014) – ASQ Quality Press
Quality Toolbox (N. Tague, 2005) - ASQ Quality Press
Statistical Process Control (J. Oakland, 2008) – Routledge
The management and control of quality (J. Evans & W. Lindsay, 2011) – West Pub
Statistical quality design and control (R. Devor, 2006) – MacMillan

Course content-related study coaching

Example exercises with solutions are discussed in the lectures.
Interactive support using Minerva (forum, email).
Feedback on case studies per group (appointment).

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Assignment, peer assessment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Exam: written exam, closed book. Students will receive a formula sheet on the exam. A simple calculator is allowed.
Permanent-evalution: case studies (group assignment). After having finished the case studied, a peer-evaluation may result in students receiving a higher/lower score than their group score.

Calculation of the examination mark

First exam period: the final grade is determined by permanent evaluation (25%) and a written exam (75%).
Second exam period: if the student passed for the permanent evaluation part, he/she transfers this score to the second exam period (25% of the final grade). If not, the grade in the second exam period is fully determined by a written exam.