



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Quality management and engineering [N1ZiIP2>ZiIJ]

### Course

Field of study

Management and Production Engineering

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

8

Laboratory classes

0

Other

0

Tutorials

8

Projects/seminars

8

### Number of credit points

3,00

### Coordinators

### Lecturers

### Prerequisites

Has knowledge of the basics of management, production management, manufacturing methods, and basic mathematical statistics.

### Course objective

Learning and understanding the importance of quality in the product life cycle. Learning and acquiring skills in practical application of basic principles, methods and tools of quality management and quality engineering. Gaining knowledge and skills in determining the quality capability and stability of the process, assessing product quality, and surveying consumer satisfaction. Learning the principles of quality management systems, system design methodology and the procedure for obtaining a certificate. Awareness of the engineer's responsibility for the quality of products.

### Course-related learning outcomes

Knowledge:

The student has knowledge of:

- quality oriented design of products and their manufacturing processes
- methods of assessing the quality capability of manufacturing processes and statistical process control
- methods of product quality control and customer satisfaction research
- the principles of quality management, including the principle of continuous improvement

- quality management systems, their design and certification

#### Skills:

The student is able to:

- conduct FMEA analysis of the process
- collect data on the quality of the process or product, determine sample statistics or population parameters and on this basis assess the quality capability of the process, quality stability of the process or the quality level of the product batch
- able, using appropriate tools and methodologies, to identify problems occurring in processes, as well as indicate the possibilities of their solution
- design basic documents of the quality management system

#### Social competences:

The student:

- can cooperate and lead a team performing tasks in the field of quality management and quality engineering
- is creative, can working in a team and is able to justify their decisions and is aware of the responsibilities resulting from them
- is able to engage in solving problems
- can independently develop and expand his competences

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Lectures

Are based on a multiple choice test. The test contains 50 questions. Minimum passing score is 50% correct answers. Exam is conducted at the end of the semester.

Assignment of grades to percentage ranges of results: <90-100> very good; <80-90) good plus; <70-80) good; <60-70) satisfactory plus; <50-60) satisfactory; <0-50) unsatisfactory.

#### Exercises

Are based on completed tasks within the scope specified in the exercise program

### Programme content

Perception and importance of quality in the product life cycle. Principles, functions, methods and tools of quality management. Capability and stability of the process. Product quality assessment. Consumer satisfaction research. Quality management systems. Designing and maintaining quality management systems. Quality economics.

### Course topics

#### Lecture:

Scope of quality engineering and quality management

Definition and aspects of quality. Quality properties of products. Quality in the product life cycle. Quality of design, process quality, performance quality, functional quality

Quality assessment. Product and process quality measures. Customer satisfaction

Quality planning, assurance and control

Principles, methods and tools of quality management

Methods of product and process quality oriented design, identification of customer expectations and requirements, QFD analysis, assessment of risk of non-fulfillment of requirements, FMEA analysis

Product and process inspection. Selection of inspection and measurement equipment

Quality capability indicators

Statistical process control (SPC), control cards

Statistical acceptance inspection

Product quality assurance in product distribution and exploitation

Quality improvement. Improvement methodologies (PDCA, DMAIC)

Quality improvement strategies: TQM, Six Sigma

Quality management systems meeting the requirements of ISO 9000.

Quality system design

Audit, certification and maintenance of quality systems

Economic aspects of quality management.

#### Exercises

Determination of quality capability indicators and design and application of a process control card

Use of quality tools in identifying problems and implementing improvement actions; process improvement using the DMAIC methodology

Creation of quality management system procedures

#### Project

Application of QFD methodology in product design

Product and process failure mode and effects analysis; FMEA

### Teaching methods

Lecture: lectures illustrated with a multimedia presentation containing the discussed program content

Exercises: solving problems and tasks

Project: development and defense

### Bibliography

#### Basic:

Hamrol A.: Zarządzanie i inżynieria jakości. Wydawnictwo Naukowe PWN, Warszawa 2017

Hamrol A.: Zarządzanie i inżynieria jakości. Ze spojrzeniem w Reczywistość 4.0. Wydawnictwo Naukowe PWN, Warszawa 2022

Zymonik Z., Hamrol A., Grudowski P.: Zarządzanie jakością i bezpieczeństwem. Polskie Wydawnictwo Ekonomiczne, 2013

#### Additional:

Starzyńska B., Hamrol A., Grabowska M.: Poradnik menedżera jakości. Kompendium wiedzy o narzędziach jakości. Wydawnictwo Politechniki Poznańskiej, Poznań 2010

Szczepańska K.: Koszty jakości dla inżynierów. Wydawnictwo Placet. Warszawa 2009

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	26	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	49	2,00