



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Social research methodology with elements of statistics [S2IBiJ1>MBSzES]

### Course

Field of study

Safety and Quality Engineering

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. inż. Ewa Więcek-Janka prof. PP  
ewa.wiecek-janka@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge of the basics of mathematics at the university level.

### Course objective

The purpose of the course is for the student to acquire basic knowledge of conducting research in the social sciences, with particular emphasis on the use of statistical methods at the stage of research preparation, development of research results and their analysis and formulation of research conclusions and recommendations in the research report.

### Course-related learning outcomes

Knowledge:

1. Student has a structured knowledge of the operationalization of the research process in safety engineering using methods of description and statistical inference and exploratory factor analysis [K2\_W01].

2. Student is able to identify the basic research paradigms according to McGrath and indicate in them the importance of quantitative and qualitative research methods in the context of safety engineering [K2\_W05].

3. Student has a structured knowledge of the strengths and weaknesses of available non-commercial and commercial systems for quantitative and qualitative data analysis [K2\_W07].

Skills:

1. Student is able to select appropriately qualitative and quantitative research methods with particular attention to the requirements of the neopositivist-functional-systemic paradigm in the context of research in safety engineering and management and quality sciences [K2\_U03].
2. Student is able to perform in a selected computer statistical package: a description of a research sample, a test of differences, a test of relationships, exploratory factor analysis, scale reliability analysis, he can also design and develop a simple qualitative study using the MAXQDA analytical package or a functionally equivalent package [K2\_U08].

Social competences:

1. Student is critical of his or her own interpretations of quantitative and qualitative research findings and is aware of the cognitive limitations of social science research [K2\_K01].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

Lecture:

Final test on Moodle - 80 points

Midterm assignments on Moodle - 20 points

Grading system

Points Grade

0 - 50 Fail (2)

51 - 59 Satisfactory (3)

60 - 69 More than satisfactory but less than good (3+)

70 - 79 Good (4)

80 - 89 Very good (4+)

90 - 100 Excellent (5)

Laboratory

Midterm assignments (1) - 50 points

Midterm assignments (1) - 50 points

Grading system

Points Grade

0 - 50 Fail (2)

51 - 59 Satisfactory (3)

60 - 69 More than satisfactory but less than good (3+)

70 - 79 Good (4)

80 - 89 Very good (4+)

90 - 100 Excellent (5)

Summative assessment:

Lecture: grade point average. Passing threshold: 50%+1.

Laboratory: average of grades. Passing threshold: 50%+1.

### Programme content

Paradigms, research programs and strategies of researchers in the social sciences.

Qualitative and quantitative research in the social sciences - essence and importance in the various research paradigms.

Conceptualization of the research process - research objectives, research field, research object, research problem, research questions, hypotheses and research statements.

Description and presentation of the collected empirical material - elements of descriptive statistics

Indicators of variables in the context of the problem of operationalization in research

Statistical inference - tests of differences and tests of relationships

Exploratory factor analysis and scale reliability testing

### Course topics

## 1 Paradigms, Research Programs, and Research Strategies in the Social Sciences.

### Overview:

This topic will cover the basic paradigms that guide research in the social sciences, including positivism, interpretivism and critical theory. The session will show how these paradigms shape research questions, methods and data interpretation. It will also discuss various research programs and strategies used within these paradigms, such as experimental approaches, longitudinal studies and case studies.

### Key issues:

Understanding paradigms: positivism, interpretivism, critical theory

How paradigms influence research design and methodology

Research agendas: exploratory, explanatory, descriptive

Strategies: experimental, longitudinal, case studies

## 2 Qualitative and Quantitative Research in the Social Sciences - Essence and Significance in Individual Paradigms.

**Overview:** This topic explores the nature and importance of qualitative and quantitative research in different research paradigms. The strengths and weaknesses of each approach will be discussed, as well as their applications and relevance in answering various research questions.

**Key issues:** Qualitative research: methods, applications, strengths and weaknesses  
Quantitative research: methods, applications, strengths and weaknesses  
The role of qualitative and quantitative research in different paradigms  
Comparative analysis of qualitative and quantitative research results

3 Conceptualization of the Research Process - Research Objectives, Research Field, Research Subject, Research Problem, Research Questions, Hypotheses

### Overview:

This session will focus on the conceptualization phase of the research process. Participants will learn how to define research objectives, identify the research field and specific subject, formulate the research problem, and develop research questions and hypotheses.

### Key issues:

Defining research goals and objectives

Identifying the research field and object of study

Formulating a clear and investigative problem

Development of research questions and hypotheses

## 4 Description and Presentation of Collected Empirical Material - Elements of Descriptive Statistics.

This topic will cover the basics of descriptive statistics and its role in summarizing and presenting empirical data. Participants will learn how to use statistical tools to describe data distributions, central tendencies and variability.

**Key topics:** Descriptive statistics: mean, median, moda, range, standard deviation  
Data presentation techniques: tables, charts, graphs  
Interpretation of measures of descriptive statistics  
Importance of descriptive statistics in empirical research

5 Indicators of Variables in the Context of Operationalization in Research  
Will address the concept of operationalization and its importance in research.

Participants will learn how to develop indicators for abstract concepts to make them measurable, ensuring that research variables are clearly defined and accurately measured.

### Key topics:

Operationalization: defining how to measure abstract concepts

Developing indicators for variables

Ensuring relevance and reliability of measurement

Examples of operationalization in social science research

## 6 Statistical Inference - Tests of Differences and Tests of Associations, Exploratory Factor Analysis and Scale Reliability Testing.

This topic will cover statistical inference techniques used in social science research. Participants will learn how to conduct tests of differences and tests of relationships and understand their application. The session will also introduce exploratory factor analysis and methods for testing the reliability of scales.

**Key topics:** Tests of differences: t-test, ANOVA  
Tests of relationships: chi-square test, correlation analysis

Exploratory factor analysis (EFA): purpose, steps, interpretation  
Reliability testing: Cronbach's alpha, test-retest reliability

## Teaching methods

### Lecture:

Conversational lecture supported by multimedia presentation. The lecture is conducted using distance

learning techniques in a synchronous mode. Acceptable platforms: eMeeting, Zoom, Microsoft Teams. Laboratory:

Programmed text in the form of laboratory instructions for solving tasks with the use of computer software, design method - designing selected elements of the research process for individual problem tasks.

## Bibliography

Basic:

1. Bednarska, S., & Brzezicka, A. (2013). Statystyczny drogowskaz 1. Praktyczne wprowadzenie do wnioskowania statystycznego, Wyd. Akademickie Sedno, Warszawa
2. Aczel, A. D., & Sounderpandian, J. (2018). Statystyka w zarządzaniu. Wydawnictwo Naukowe PWN.

Additional:

1. Rabiej, M. (2018). Analizy statystyczne z programami Statistica i Excel. Wydawnictwo Helion.
2. King, B. M., & Minium, E. W. (2020). Statystyka dla psychologów i pedagogów. Wydawnictwo Naukowe PWN
3. Brzeziński, J. (2021). Metodologia badań psychologicznych. Wydawnictwo Naukowe PWN.
4. Nowak, S. (2007). Metodologia badań społecznych. Państwowe Wydawn. Naukowe
5. Brzeziński, J. M. (2012). Metodologia badań społecznych. Wybór tekstów.
6. Mierziak, R. (2019). Characteristics of selected approaches of uncertainty modelling in the context of management sciences. Humanities and Social Sciences, 26(1), 67-77.
7. Kujawińska, A., & Więcek-Janka, E. (2010). Statystyka matematyczna. Wydawnictwo Politechniki Poznańskiej.

## Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00