SUBJECT DATASHEET

Risk and reliability

BMEGT20MN67

I. SUBJECT DESCRIPTION

1. SUBJECT DATA

Subject name
Risk and reliability

ID (subject code)	BMEGT20MN67

Type of subject
contact lessons

Course types and lessons

Type	*Lessons*
Lecture	2
Practice	0
Laboratory	0

Type of assessment
term grade

Number of credits
3

Subject Coordinator

Name	*Position*	*Contact details*
Dr. Benedek Petra	assistant professor	benedek.petra@gtk.bme.hu

Educational organisational unit for the subject
Department of Management and Business Economics

Subject website
https://edu.gtk.bme.hu/

Language of the subject
magyar - HU, English - EN

Curricular role of the subject, recommended number of terms

Direct prerequisites

Strong	None
Weak	None
Parallel	None
Exclusion	None

Validity of the Subject Description
Approved by the Faculty Board of Faculty of Economic and Social Sciences, Decree No: 580269/9/2025 registration number. Valid from: 26.03.2025.

2. OBJECTIVES AND LEARNING OUTCOMES

Objectives

Risk and reliability are significant in engineering, technology, and financial management. The course presents economic and reliability analysis of product and process planning and operation. The fundamental objective of this subject is to present the essential reliability theory, decision theory, and compliance approaches that support management problem-solving processes. Risk and reliability play a fundamental role in these areas.

Academic results

Knowledge

1. Students know the basic concepts of reliability theory, maintenance planning, and Total Productive Maintenance (TPM).
2. Students understand the methods of solving problems that arise during plant maintenance.
3. Students know the basic mathematical indicators and methods of testing and modeling the lifetime of products and equipment.

Skills

1. By applying the learned theories and methods, students uncover, organize and analyze facts and fundamental relationships, formulate independent conclusions and critical comments, prepare decision-preparatory proposals, and make decisions.
2. Students can apply techniques for solving plant maintenance problems, considering their application conditions and limitations.
3. Students can calculate product/technology indicators and conclude from them.

Attitude

1. Students are open and receptive to new results of economic science and practice.
2. Students are committed to their profession, know and accept its basic values and standards, and strive to interpret and develop them critically.
3. Students are driven by curiosity, the desire to learn facts and connections during their professional work.

Independence and responsibility

1. Students use a systematic approach in their thinking.
2. Students take responsibility for their analyses, conclusions and decisions.
3. Students are independent, constructive and assertive in cooperation within and outside the institution.

Teaching methodology

Lectures, optional individual and groupwork tasks.

Materials supporting learning

- Kötelező irodalom a tárgyhoz készített jegyzet, a tanuláshoz felhasználandó az előadásokon bemutatott prezentációk. / Mandatory literature is the notes prepared for the subject, and the presentations presented at the lectures.
- Dr. Kövesi J.: Megbízhatóságelméleti alapok. Oktatási segédanyag, 2024.
- Dr. Kövesi J. (szerk): Minőség és megbízhatóság a menedzsmentben. Typotex Kiadó, Budapest, 2011
- Dr. Kövesi J. – Erdei J. – Dr. Tóth Zsuzsanna Eszter: Döntéselmélet és döntésmódszertan. Oktatási segédanyag, 2024.
- Dr. Benedek P. – Dr. Bognár F.: Kockázatértékelés. Oktatási segédanyag, 2024
- David J. Smith: Reliability, Maintainability and Risk: Practical Methods for Engineers

II. SUBJECT REQUIREMENTS

TESTING AND ASSESSMENT OF LEARNING PERFORMANCE

General Rules

The assessment of the learning outcomes set out in point 2.2. The course ends with an exam grade, which can be obtained as a written exam at the end of the semester. The signature requirement is that the student achieves the minimum score (10 points) during the practical
classes held during the semester. An optional partial performance evaluation (active participation) can be used to earn extra points for the exam grade during the semester.

Performance assessment methods

A. Detailed description of performance assessments during the period: The subject can be completed as a result of 1 midterm and two (out of three) exercises. There will be three practical exercises during the semester, the dates of which will be announced at the beginning of the semester and published on the subject website. Students can earn a maximum of 10 points by solving practical tasks independently (at most in small groups) in these classes. The score achieved in the two exercises that are most favorable for the student to complete the subject will be calculated. Students can receive extra points for active participation in contact classes (max. 20% of the grade), which will be included in the final grade after reaching at least 50% from the midterm and practical exercises toge

Percentage of performance assessments, conducted during the study period, within the rating

- **practice 1**: 10
- **practice 2**: 10
- **midterm**: 80
- **active participation**: 20
- **total**: 100

Percentage of exam elements within the rating

Conditions for obtaining a signature, validity of the signature

Issuing grades

Excellent	86
Very good	80-85
Good	70-79
Satisfactory	60-69
Pass	50-59
Fail	0-49

Retake and late completion

Due to their nature, exercises cannot be replaced/retaken. The midterm can be replaced/retaken once at the time specified at the beginning
of the semester. There are no more options.

Coursework required for the completion of the subject

részvétel a kontakt tanórákon	24
preparation for classes	26
preparation for the midterm and practices	40
total	90

Approval and validity of subject requirements

Consulted with the Faculty Student Representative Committee, approved by the Vice Dean for Education, valid from: 03.03.2025.

III. COURSE CURRICULUM

THEMATIC UNITS AND FURTHER DETAILS

Topics covered during the term

The subject consists of the following thematic blocks to achieve the learning outcomes set out in point 2.2. Each semester the syllabus schedules these topics according to the calendar and other conditions.

1 Reliability theory foundations, fault-freeness.
2 Basic reliability distributions.
3 Errors made during sampling and inference.
4 Recoverable elements and systems.
5 Reliability-based maintenance.
6 Decision theory foundations.
7 Ranking methods. Paired comparison.
8 Group decisions. Rank correlation
9 Risk management foundations
10 Risk assessment methods
11 Theoretical distributions used in reliability theory.
12 Parameter estimation and distribution analysis.
13 System reliability.
14 Failure analysis methods.
15 Investigating recoverable systems. Repairability and durability indicators.
16 Basic maintenance strategies.
17 Total Productive Maintenance (TPM)

Additional lecturers

Kövesi János	emeritus professor	kovesi.janos@gtk.bme.hu
Fatma Aslan	egyetemi adjunktus	aslan.fatma@gtk.bme.hu
Erdei János	mesteroktató	erdei.janos@gtk.bme.hu

Approval and validity of subject requirements