SYLLABUS

1. Course title:

DESIGN AND ANALYSIS OF INDUSTRIAL EXPERIMENTS

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

Mandatory

6. Prerequisites:

7. Class restrictions:

8. Duration / semester(s):

1 7

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	3			Classes:	45
9.2. Seminars	1			Individual work:	98
9.3. Laboratory / Practice classes	0			In total:	143

10. Faculty:

Faculty of Mechanical Engineering Tuzla

11. Department/study program:

Manufacturing Mechanical Engineering

12. Lecturer:

prof. Emir Šarić, PhD

13. Course aims:

It is to understand importance of statistically designed experiments in data analysis and to gain knowledge how to perform and analyse : Simple Comparative Experiments, ANAOVA, Multiple Regression and Factorial Designs manually and using Software.

The knowledge of above said methods will enhance the knowledge level of students to match industrial requirements.

14. Learning outcomes:

After learning course the students should be able to
- present the experimental data numerically and graphically
- build the mathematical models using simple and multiple linear regression
- understand importance of statistically designed experiments in data analysis
- design industrial experiments
- analyze and interpret the results of: Simple Comparative Experiments, ANOVA, Multiple Regression and Factorial Designs

15. Course content:

1. Introduction,
2. Goals of Experimental Modeling, Response and Explanatory variables,
3. Measures of the Center (mean value, median), Measures of Spread (Variance, Standard Deviation), Relatins between variables, Scatter plot, Correlation,
4. Regression, Simple Linear and Non-linear Regression,
5. Regression Diagnostics, Examples
6. Comparative Experiments,
7. One Factor and Multivariate ANOVA,
8. Courese (first part) Overview and Exam,
9. Design of Experiments Terminology and Methodology,
10. Full Factorial Designs,
11. Yates Algoritm,
12. Fractional Factorial Designs,
13. Response Surface Designs,
14. Taguchy Method,
15. DOE Optimisation and (second part) Exam

16. Learning methods:

The learning activities will be realized through a combination of lectorials, discussion groups, practical case studies by use of appropriate techniques and consultations. Independent learning includes hours engaged with essential reading and assignment preparation.

17. Assessment methods:

• Lectures – theoretical lectures, active two-way communication between student and professor, compulsory attendance of students;
• Theory tests - solving tests;
• Tests with tasks - solving tests;
• Seminar/graphic works – independent work of the student to solve the problem;
• Oral final exam - interactive conversation with the student in order to validate the acquired knowledge;
• Consultations – clarification of any ambiguities related to the topic of the studied subject.

The condition for signing is the student's attendance at a minimum of 70% of lectures and exercises.
Grading Scale:

Grade	Descriptive	Letter	Points
5 (five)	Does not meet minimum criteria	F, FX	<54
6 (six)	Meets minimum criteria	E	54÷64
7 (seven)	Generally good, but with significant shortcomings	D	65÷74
8 (eight)	Average, with noticeable errors	C	75÷84
9 (nine)	Above average, with occasional errors	B	85÷94
10 (ten)	Exceptional success with no errors or with minor errors	A	95÷100.

18. Assessment components:

Individual and group activities 20 bod.
Semestral work 30 bod.
Final exam 50 bod,
Total 100 bod.

19. Mandatory reading list:

1.Davis, O.V.; The Design and Analysis of Industrial Experiments, Longman, London.
2. Šarić, E.; Dizajn i Analiza Eksperimenata, Autorizovana Predavanja.

20. Additional reading list:

1. Holman, J.P.: Experimental Methods for Engineers, McGraw Hill Int., New York.
3. Ekinović, S.; Metode statističke analize U MS Excel-u, MF Zenica, 1997.

21. Web sources:

22. Applicable from the academic year:

2025/2026

23. Adopted in the Faculty/Academy session:

25.04.2025