

**School of Engineering and Natural Sciences / Industrial Engineering (English)**

**2024 - 2025 Academic Year**

**DESIGN of EXPERIMENT**

**Syllabus**

| <b>Course Description</b>  |   |                                |                           |               |             |
|--|---|--------------------------------|---------------------------|---------------|-------------|
| <b>Name</b>  | <b>Code</b>   | <b>Semester</b>                | <b>T+A Hour</b>           | <b>Credit</b> | <b>ECTS</b> |
| DESIGN of EXPERIMENT   | IND4210796  | Spring Semester                | 3+0                       | 3             | 6           |
| <b>Prerequisites Courses</b>   | OLASILIK VE RASSAL DEĞİŞKENLER  |                                |                           |               |             |
| <b>Recommended Elective Courses</b>  |   |                                |                           |               |             |
| <b>Language of Instruction</b>   | English   |                                |                           |               |             |
| <b>Course Level</b>  | First Cycle (Bachelor's Degree)   |                                |                           |               |             |
| <b>Course Type</b>   | Elective  |                                |                           |               |             |
| <b>Course Coordinator</b>  | Assoc.Prof. Melis Almula KARADAYI   |                                |                           |               |             |
| <b>Name of Lecturer(s)</b>   | Assoc.Prof. Melis Almula KARADAYI   |                                |                           |               |             |
| <b>Assistant(s)</b>  |   |                                |                           |               |             |
| <b>Aim</b>   | This course aims to teach the basic principles and methods of statistical experimental design.  |                                |                           |               |             |
| <b>Course Content</b>  | This course contains; Review of Basic Statistical Concepts,Introduction to Design of Experiments,Comparing Multiple Means. Analysis of Variance (ANOVA),Single Factor Experiments & One-Way Analysis of Variance,One-Way Analysis of Variance. Simultaneous Confidence Intervals. Parameter Estimation.,Expected Mean Square (EMS) & Power Calculations,Special Case of Two Averages,Random Effects Model,Randomized Block Designs,Multifactor Designs,Two-Factor Experiments I,Two-Factor Experiments II,Mixed Effect Models,2k Multifactor Designs. |                                |                           |               |             |
| <b>Course Learning Outcomes</b>  |   | <b>Teaching Methods</b>        | <b>Assessment Methods</b> |               |             |
| 5.Use statistical package SPSS.  |   | 13, 14, 9                      | F                         |               |             |
| 4.Evaluate random effects and mixed effects  |   | 12, 13, 9                      | A                         |               |             |
| 3.Analyze the results of the experiment with Analysis of Variance (Anova)  |   | 12, 13, 9                      | A                         |               |             |
| 1. Collect, analyze, interpret and present data  |   | 13, 14, 16, 9                  | A                         |               |             |
| 2. Design Engineering Experiments  |   | 13, 16, 9                      | A                         |               |             |
| <b>Teaching Methods</b>  | 12: Problem Solving Method, 13: Case Study Method, 14: Self Study Method, 16: Question - Answer Technique, 9: Lecture Method  |                                |                           |               |             |
| <b>Assessment Methods</b>  | A: Traditional Written Exam, F: Project Task  |                                |                           |               |             |
| <b>Lecture Schedule</b>  |   |                                |                           |               |             |
| <b>Sequence</b>  | <b>Topics</b>   | <b>Preliminary Preparation</b> |                           |               |             |
| 1  | Review of Basic Statistical Concepts  |                                |                           |               |             |
| 2  | Introduction to Design of Experiments   |                                |                           |               |             |
| 3  | Comparing Multiple Means. Analysis of Variance (ANOVA)  |                                |                           |               |             |
| 4  | Single Factor Experiments & One-Way Analysis of Variance  |                                |                           |               |             |
| 5  | One-Way Analysis of Variance. Simultaneous Confidence Intervals. Parameter Estimation.  |                                |                           |               |             |
| 6  | Expected Mean Square (EMS) & Power Calculations   |                                |                           |               |             |
| 7  | Special Case of Two Averages  |                                |                           |               |             |
| 8  | Random Effects Model  |                                |                           |               |             |
| 9  | Randomized Block Designs  |                                |                           |               |             |
| 10   | Multifactor Designs   |                                |                           |               |             |
| 11   | Two-Factor Experiments I  |                                |                           |               |             |
| 12   | Two-Factor Experiments II   |                                |                           |               |             |
| 13   | Mixed Effect Models   |                                |                           |               |             |
| 14   | 2k Multifactor Designs  |                                |                           |               |             |
| <b>Evaluation Methods</b>  |   | <b>Weight(%)</b>               |                           |               |             |
| Midterm Exam   |   | 30                             |                           |               |             |
| General Exam   |   | 70                             |                           |               |             |
| <b>Resources</b>   |   |                                |                           |               |             |
| Design and Analysis of Experiments, 7th Ed. D. C. Montgomery, John Wiley & Sons, 2009.Probability and Statistics for Engineers and Scientists, 9th Ed. R. E. Walpole, R. H. Myers, S. L. Myers and K. Ye , Pearson Education 2012. |   |                                |                           |               |             |