Course Syllabus
İST292 – STATISTICS

Instructor: Dr. Mustafa Murat ARAT
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Office: Room Number 12, Department of Statistics, Hacettepe University, Beytepe Campus
Office Hours: Thursdays / 10:40-11:40
Course Days and Hours: Thursdays / 13:40 – 16: 30
Course Location: Classroom #7 at Department of Chemical Engineering, Hacettepe University, Beytepe Campus
Course Credits: 5 AKTS
Course Webpage: HADİ platform of Hacettepe University (hadi.hacettepe.edu.tr)
Softwares: SPSS/ R / Python

Course Objective: Providing students with the definition, purpose and importance of statistics; enabling students to gain knowledge about the concepts that form the basis of statistics; Summarizing and analyzing data using univariate and multivariate approaches.

Course Resources:
1. Toktamış, Ö., Turkan, S., 2021, R Programı ile İstatistiğe Giriş, Seçkin Yayınevi (3rd Edition).
2. Toktamış, Ö., Turkan, S., 2020, R Programı ile Temel İstatistiksel Yöntemler, Seçkin Yayınevi (2nd Edition)
3. Ott, R. L. and Longnecker, M. 2021, An Introduction to Statistical Methods and Data Analysis, Cengage Learning, (7th Edition).
4. Bruce, P., Bruce, A. and Gedeck, P., 2020, Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python, O'Reilly Media (2nd Edition).

Learning Outcomes:
By the end of this course students will be able to:
1. Describe the definition and the aim of statistic.
2. Describe the basic concepts (population, sampling, parameter, statistic, data, variable etc.)
3. Infer the frequency distributions of raw data and plot appropriate graphs.
4. Use measures of central tendency and measures of dispersion for univariate analysis.
5. Infer probability (definition and basic concepts).
6. Infer probability distributions (binom, poisson, normal etc.)
7. Make multivariate analysis using Regression and ANOVA.

Grading: Quizzes and Homeworks %20, Midterm %30, Final %50.

Accommodations: Any student requiring special accommodations for any reason should contact the instructor as soon as possible.

Attendance Policy: All students attend a minimum of 70% of class hours during their course. If you come after the instructor (when the door is closed) or leave any class for more than 5 minutes you will be marked absent for that class. All absences from class are counted as official absences. If you have a special excuse, please write to instructor not too late.

Class Policy: You must be in class before the lecture starts. You are expected to do your best to be in class on time. You are not allowed to enter the classroom after the lecture starts. You must turn off all your mobile phones. During the lecture, you must avoid all activities that are better performed elsewhere. Besides, do not hesitate to ask any questions related to the lecture during the courses!

General Comments: (1) If you are having problems with the course, come and discuss the situation with me as soon as possible. **(2)** If you are having problems with **ME**, come and discuss the situation with me as soon as possible. **(3)** If the pace of the lectures is too fast or slow, let me know. I am not always aware of it, no matter how obvious it may be to you. **(4)** If you have a question, please first use Google and search and try to understand by yourself. If it does not help, just let me know!

Cheating & Plagiarism: You are responsible for knowing the University policies on cheating and plagiarism. Not giving credit to a person for their intellectual work and passing it off as your own is stealing. If you have any questions or concerns about whether your behavior could be interpreted as plagiarism, please ask me before you submit the work.

Course Outline (tentative):

Weeks	Topics

1.	1. Statistics
	    1.1 Definition of statistics
	    1.2 Context of statistics
	    1.3 History of statistics

2.	2. Data, collection and description of data
	    2.1 Data concept and type of data
	    2.2 Collection of data
	    2.3 Frequency tables
	    2.4 Plots
	    2.5 Applications

3.	3. Measures of location and dispersion
	    3.1 Location measures in quantitative data
	    3.2 Dispersion measures in in quantitative data
	    3.3 Proportions and variance in qualitative data
	    3.4 Applications

4.	4 Probability and probability distributions
	    4.1 Randomness and classical definition of probability
	    4.2 Axiomatic definition of probability, random variable, expected value, variance

5.	4.3 Probability distributions
	    4.4 Discrete probability distributions
	    4.5 Continuous probability distributions
	    4.6 Applications

6.	5. Sampling distributions
	    5.1 Central Limit Theorem
	    5.2 Distribution of sample mean
	    5.3 T- Distribution
	    5.4 Chi-square Distribution
	    5.5 F- Distribution

7.	*Midterm*

8.	7. Statistical hypothesis testing
	    7.1 Test of population mean
	    7.2 Test of population variance
	    7.3 Test of population proportion
	    7.4. Applications

9.	7.5 Test of difference of two population means
	    7.6 Test of homogeneity of two population variances
	    7.7 Test of difference between two population proportions
	    7.8 Applications

10.	8. Contingency tables
	    8.1 Descriptive statistics in $(R \times C)$ contingency tables
	    8.2 Hypothesis testing and chi-square analysis in $(R \times C)$ contingency tables
	    8.2 Coefficient of correlation in $(R \times C)$ contingency tables
	    8.3 Applications

11.	9. Simple linear regression and correlation analysis
	    9.1 A general look to regression analysis
	    9.2 Estimation and test of regression coefficients

12.	9.3 Interval estimation of regression coefficients
	    9.4 Correlation
	    9.5 Applications

13.	10. One way ANOVA
	    10.1 A general look to regression analysis one way ANOVA
	    10.2 Test for homogeneity of variances

14.	10.3 Variance analysis table
	    10.4 Multiple comparison tests
	    10.5 Applications

15.	Discussion
16.	*Final exam*