Istanbul Technical University – Department of Architecture

# MIM 305E – Statistics, 22225
Course Syllabus | 2019-2020 Spring Semester

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| Course Day and Hour : Mondays, 8:30h-11.30h | Course Instructor: Michael S. Bittermann<br>e-mail: bittermann@itu.edu.tr |
| Course Room : 215<br>Laboratory: BIM 1 | |
| Course Credit :<br>Local: 2.5; ECTS: 4 | Office no: 209-D |
| Course Web Site : https://ninova.itu.edu.tr/Ders/12456 | |

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| Course Assistant/s: Hande Nur Gülecoglu |
| e-mail: nurhandegulecoglu@gmail.com |
| Office no: t.b.a. |

## Course Description

In this compulsory unit of study the theory and methodology of statistics is introduced. In the first half of the course the probability theoretic concepts underlying statistical descriptions are explained; these include event, random variable, probability density, probability, and probability distribution. In the second half the principle of statistical inference and the associated concepts of hypotheses testing and confidence intervals are described. Inference is exemplified via the t-test, Chi-squared test of independence, as well as linear regression. The premises underlying the statistical treatments are highlighted, and the significance of the methodology in studies of architecture is indicated.

## Course Structure and Plan

The course is structured in two parts: The first one is on descriptive statistics; the second one is on inferential statistics

Course Plan

| WEEK | DATE | TOPIC |
|---|---|---|
| 1 | 10-Feb | Introduction to the course |
| 2 | 17-Feb | Introduction to quantitative reasoning, probability and statistics |
| 3 | 24-Feb | Probability I: outcome and event, rules of probability, mathematical expectation |
| 4 | 02-Mar | Probability II: probability density, probability distribution |
| 5 | 09-Mar | Laboratory I: Distributions and Graphs |
| 6 | 16-Mar | Statistics for samples: sampling distribution; point and interval estimation |
| 7 | 23-Mar | Laboratory II: Sampling |
| 8 | 06-Apr | Mid Term Exam |
| 9 | 13-Apr | Hypothesis testing I: $t$-test |
| 10 | 20-Apr | Hypothesis testing II: difference among $k$-means, Chi-squared test |
| 11 | 27-Apr | Laboratory III: Hypothesis testing |
| 12 | 04-May | Linear regression; least squares |
| 13 | 11-May | Laboratory IV: Linear regression |
| 14 | 18-May | Applying statistics in study of architectural issues |

## Recommended Readings

Text book underlying the course content

J. E. Freund and B.M Perles. *Statistics - A First Course*, Eight edition. Pearson Prentice Hall, 2004

Note: obtaining a copy of the text book is mandatory; one option is to obtain a copy made available through the print shop at the basement floor. Obtaining the book in the first week of the semester is recommended, so that you deepen and refine your understanding of the material presented in the lectures. An added benefit is that the book enables you to timely practice the use of the statistical tables that you will be using during both exams.

Recommended further reading on probability theory

C. Ash. The Probability Tutoring Book - *An intuitive Course for Engineers and Scientistis (and everyone else!)*. IEEE Press, New York, 1992

## Course Assessment

Grading components

1. Mid-term Exam: 50 % of the course grade
2. Final Exam: 50 % of the course grade

For final exam policy, please also see: http://www.sis.itu.edu.tr/tr/sinav_programi/ekSinavHakkiDuyuru.html . The minimum mid-term grade to avoid failure (VF) and to earn the right to take the final exam is to get a grade that is at least 30 % of the Course Mark in the mid-term exam. Also, see the course attendance policy below for additional conditions as to avoiding VF.

Content of the exams

Both exams will be exclusively in written form. The mid-term exam will cover all the subjects treated in the lectures from the beginning of the term until the date of the exam. The final exam will cover all the subjects treated in the lectures throughout the term.

Assessment criteria for both exams

1. understanding the concepts involved in statistical treatments
2. correctly selecting and carrying out statistical computations

## Contributors

The execution of the teaching and examinations is assited by Hande Nur Gülecoglu

## Communication

Announcements will be posted on the course website with the URL given above. It is the student's responsibility to check the website and also his/her İTÜ (Ninova) registered email frequently enough to be able to follow the requirements described in the announcements in a timely manner.

## Plagiarism

University policy prohibits plagiarising any material, and this particularly applies to students. In case a student presents the thoughts or works of another person as his/her own, this constitutes plagiarism and is penalized as stipulated by the university policy[1]. Plagiarism may include, but is not limited to:

1. copying or paraphrasing material from any source without due acknowledgment,
2. using another's ideas without due acknowledgment
3. working with others without the instructors' permission and presenting the resulting work as though it was completed individually

Plagiarism is not only related to written works, but applies also to other expressions of human intellect and forms of intellectual property; including images, drawings, models, music, mathematical expressions, web-content, computer programs, collected data, and so on. Aiding another student to plagiarize is also a violation of the plagiarism policy and may invoke a penalty.

## Attendance

Attendance to all lectures and laboratory hours is mandatory. Absence in circumstances beyond the student's control is acceptable up to a maximum of 4 lecture/lab days, while the attendance in week number 1 is not counted. Exceeding the limit implies VF grade.

Note that signing in the place of another student constitutes a *document fraud*, which is a severe violation of ethical norms that cannot be tolerated.

A student entering the class room late manifests disrespect towards his/her fellow students, as he/she interrupts their knowledge assimilation to some extent. Entering the room excessively late, i.e. entering it later than 40 minutes after 8:30h, implies he/she has already missed more than 30% of the lecture content, so that he/she loses the right to be registered as having attended the lecture. The same loss of rights occurs when a student leaves the lecture significantly earlier than 11.30h. The instructor may take attendance at any time during a lecture or a lab lesson; yet, it is the responsibility of the student to verify before the lesson end that his/her attendance is duly registered.

Viewing content on a mobile device, including reading or writing text messages, during the class and outside of a lesson break, implies non-attendance of the course for the duration of the communication. The same applies for sleeping during the lecture. Clearly it is problematic to estimate the duration such an event by an observer who is not engaged in constantly monitoring the audience' behaviour. Therefore the condition, a student holds a mobile device in his/her hands while the lesson takes place has to be deemed sufficient evidence that he she was not attending the lecture, implying that he/she loses the right for registering his/her attendance.

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[1] For further information on the university's policy on plagiarism and the associated sanctions, refer to the university web-site. For instance, plagiarism in the context of an examination ('cheating') is to be sanctioned by expelling the student from the university for an extended time period.