Clinical Biostatistics and Statistical Genetics

1. Instructors

Name	Position	Department	Contact Information
TAKAHASHI Kunihiko	Chief Instructor / Professor	Department of Biostatistics	kunihikot.dsc@tmd.ac.jp

2. Classroom/Lab Lecture Location
Via Zoom

3. Course Purpose and Outline
Course Purpose:
This course introduces the basic techniques important for analyzing data from epidemiologic, biomedical and other public health related research. Statistical reasoning will be emphasized through problem solving and practical applications.

Outline:
Biostatistics is the application of statistical methods to data in biological, biomedical and health sciences. It is a key technique for the collection, analysis, and presentation of data especially in quantitative studies including epidemiological studies. Throughout the seminar, we will review the broad field of statistical data analysis and the range of issues that arise when analyzing health data. We will read and discuss selected chapters from a textbook and apply statistical methods to wide range of quantitative study questions.

4. Course Objectives
By the end of this course, students will be able to:
  - Interpret basic statistical terminologies.
  - Explain assumptions and conditions for basic statistical techniques, and judge which statistical technique to use in a given situation.
  - Conduct basic statistical techniques both by hand and using a statistical software, and present results using publication quality tables.
  - Describe results of statistical analysis using standard statistical expressions.

5. Format
This course will consist of lectures and optional laboratory sessions. There will be daily homework assignments and an examination on the final day.

6. Course Details

No.	Topics
1	Lecture: Introduction to Biostatistics (1)
2	Lecture: Data presentation; Numerical summary measures (1)
3	Lecture: Data presentation; Numerical summary measures (2)
4	Lecture: Probability and Theoretical probability distributions (1)
5	Lecture: Probability and Theoretical probability distributions (2)
6	Lecture: Sampling distribution of the mean; Confidence intervals
7	Lecture: Hypothesis testing; Comparison of two means (1)
8	Lecture: Hypothesis testing; Comparison of two means (2)
9	Lecture: Analysis of Variance; Nonparametric methods (1)
10	Lecture: Analysis of Variance; Nonparametric methods (2)
11	Lecture: Inference on proportions; Contingency tables; Multiple 2 by 2 tables (1)
12	Lecture: Inference on proportions; Contingency tables; Multiple 2 by 2 tables (2)
13	Lecture: Correlation; Simple linear regression; Multiple regression (1)
14	Lecture: Correlation; Simple linear regression; Multiple regression (2)
15	Lecture: Logistic regression
16	Final Exam

7. Assessment

An overall assessment of graduate school students who have participated in at least 2/3 of face-to-face lectures (including a part of those streamed live) will be made. It will comprise of the student's attitude (participation in discussions, presentations, etc.) (30%), short tests (30%) and reporting assignments (40%). If the course is taken through E-learning, there will be a confirmation exam after the coursework is completed (also through E-learning) to assess the participant's understanding of the content. Those who pass the exam will be regarded as having fully attended this course. In those cases, the overall assessment will comprise reports with respect to discussions in the class (30%), short tests (30%) and report assignments (40%).

8. Prerequisite Reading

Reading materials will be available online through the course webpage. Students are expected to have worked thorough the materials before attending the corresponding class.

9. Reference Materials

Pagano M, Gauvreau K. Principles of Biostatistics. 2nd ed. Belmont: Brooks/Cole; 2000.
Rosner B. Fundamentals of Biostatistics. 8th ed. Brooks/Cole; 2015.

10. Language Used

All classes are conducted in English.

11. Office Hours

Mon – Fri: 9:00 AM – 17:00 PM
Contact: TAKAHASHI Kunihiko, Department of Biostatistics
         E-mail: biostat.dsc@tmd.ac.jp
Please contact the instructor regarding questions or consultations.

12. Note(s) to Students

Permission from the chief instructor is required in order to register for this course.

This course uses the statistical software Stata. Stata is available for each student during the course.

Students are expected to perform basic algebra, including logarithms and exponentials, by hand or using a calculator.