

BIOSTATISTICS (BIOSTAT)

BIOSTAT 200 Biostatistical Methods in Clinical Research I (3 Units) Fall

Instructor(s): Ali Mirzazadeh

Prerequisite(s): None

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Project, Lab skills

Course is an introduction to the study of biostatistics. Course addresses types of data, their summarization, exploration and explanation, as well as concepts of probability and their role in explaining uncertainty. Course concludes with coverage of inference applied to means, proportions, regression coefficients and contingency tables. Throughout the course, the software program STATA will be used.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 202 Opportunities and challenges of complex biomedical data (3 Units) Summer

Instructor(s): Aaron Scheffler

Prerequisite(s): None

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Project, Lab skills

This is an introduction to the opportunities and challenges of using large datasets for biomedical research. Topics to be covered include: What makes big data different? What big data can and cannot do. Phases of data science: getting data, merging and cleaning data, storing and accessing data, visualizing or telling stories with data, drawing conclusions from data. Introduction to supervised and unsupervised machine learning including detailed discussion of algorithms and model fitting.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 208 Biostatistical Methods II (3 Units) Winter

Instructor(s): Aaron Scheffler

Prerequisite(s): Designing Clinical Research (EPI 202), and Biostatistical Methods I (BIOSTAT 200). Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting.

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture

Instruction in multiple predictor analyses as a tool for control of confounding and for constructing predictive models. Topics will include exploratory data analyses, linear regression, and logistic regression. The STATA statistical package will be used.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 209 Biostatistical Methods III (3 Units) Spring

Instructor(s): Chiung-Yu Huang

Prerequisite(s): EPIDEMIOLOG 202, BIOSTAT 208. Possession of a graduate or professional doctoral degree (MD, PhD, DDS, PharmD, or international equivalent), currently enrolled in an undergraduate, graduate, or professional school, or relevant work experience. Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting.

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Project, Lab science

Advanced instruction in multiple predictor analyses. Topics will include survival analysis and regression for repeated measures. In the final weeks of the course, participants will receive individualized instruction for the analysis of their own data.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 210 Biostatistical Methods IV (2 Units) Fall

Instructor(s): Dave Glidden

Prerequisite(s): Possession of MD, PhD, DDS or PharmD degree and Epidemiology 202 and Biostatistics 208 and 209. Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting.

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture

This is a continuation of the Biostatistical Methods in Clinical Research series, covering additional methods in multi-predictor analyses and allowing more in-depth exploration of the topics covered in Biostat I, II and III. Topics in survival analysis and longitudinal analysis will be emphasized and students are also encouraged to utilize their own projects to motivate discussion and to suggest topics of interest.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 211 Mathematical Foundations of Biostatistics (2 Units) Winter

Instructor(s): Fei Jiang

Prerequisite(s): Calculus is a prerequisite for this class. For example, students must understand integration and derivatives. A previous or concurrent course in introductory biostatistics is preferred, BIOSTAT 200

Restrictions: This course is part of the Epidemiology and Translational Science PhD program and may have space limitations. Auditing is not permitted.

Activities: Lecture

The goal of this course is to equip students with core statistical concepts and methods. In this course students will learn mathematical, computational, statistical and probabilistic background; the basics of probability distributions including the definitions of density functions, cumulative distributions, moments of the distributions; theory and methods for point estimation; and methodology for the construction of hypothesis testing and confidence intervals. R statistical software will be used

School: Graduate Division

Department: Epidemiology And Translational Sciences Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 212 Introduction to Statistical Computing in Clinical Research (1 Units) Summer

Instructor(s): Aida Venado Estrada

Prerequisite(s): EPI 180.04 and possession of a MD, PhD, DDS or PharmD or equivalent doctoral degree. Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting.

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted. Preference is given to UCSF-affiliated personnel.

Activities: Lecture

This course will introduce clinical researchers to the use of computer software for managing and analyzing clinical research data. Currently available statistical packages will be described and the roles of spreadsheet and relational database programs discussed. Use of STATA for managing, cleaning, describing, and analyzing data will be taught in lecture and laboratory sessions.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? No

Repeat course for credit? No

BIOSTAT 213 Programming for Health Data Science in R (2 Units) Summer

Instructor(s): Stathis Gennatas

Prerequisite(s): No prior programming experience is required.

Restrictions: This course is part of the Training in Clinical Research (TICR) and Health Data Science Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Lab science

Vast amounts of health-related data are being generated daily and at an increasing rate. Our ability to extract insights and make the most of these resources depends on the effective and efficient use of computational tools to preprocess, visualize, and analyze different types of data. BIOSTAT 213 is an introductory programming course which aims to provide hands-on experience in the R language and enable further work in biostatistics, epidemiology, and machine learning/health data science.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 214 Programming for Health Data Science in R II (2-3 Units) Fall

Instructor(s): Stathis Gennatas, John Kornak

Prerequisite(s): BIOSTAT 213 or equivalent.

Restrictions: This is a core course of the Health Data Science (HDS) program and part of the Training in Clinical Research Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Lab skills

R programming course to enable work in any field including biostatistics, epidemiology, data science/machine learning. This course builds on students prerequisite core R language knowledge to cover skills in advanced data transformations, visualization, working with big (in-memory) data, report-writing, and core statistic testing.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 215 Strengthening causal inferences based on observational data (3 Units) Spring

Instructor(s): Thomas Newman

Prerequisite(s): EPIDEMIOLOG 203, BIOSTAT 208, and BIOSTAT 209 (may be enrolled concurrently). Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting.

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Lab skills, Discussion

The course will define causal effects in terms of potential outcomes, show when standard regression methods do and do not support causal inferences, and show how to estimate and interpret marginal and conditional causal effects. It will also cover propensity scores, inverse probability weighting, marginal structural models (for time-dependent treatments with time-dependent confounder/mediators), mediation analysis, new-user designs, instrumental variables, and principal stratification.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 216 Machine Learning in R for the Biomedical Sciences (3 Units) Winter

Instructor(s): Adam Olshen

Prerequisite(s): BIOSTAT 208, BIOSTAT 213 & BIOSTAT 209. Exceptions to these prerequisites may be made with the consent of the Course Director, space permitting. Strongly recommended: EPI 204 & BIOSTAT 202

Restrictions: This course is part of the Training in Clinical Research (TICR) Program and may have space limitations. Auditing is not permitted.

Activities: Lecture, Project

This is a course that covers machine learning methods as they apply to areas of biomedical research and will teach how to implement the methods in R. Topics to be covered include: What is Machine learning? Prediction techniques (including classification) and methods for assessing them, Cross-validation, penalized regression methods such as lasso, boosting, bagging and ensemble methods, pattern recognition, deep learning, and data reduction methods, and machine learning meta packages in R.

School: Graduate Division

Department: Clinical Research Program

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: Letter Grade, P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 272 Foundations in Biostatistical Principles and Methods (4 Units) Fall

Instructor(s): Patrick Phillips, Suzanne Dufault

Prerequisite(s): There are no formal prerequisites. Students are expected to have knowledge of undergraduate statistics. We will primarily use the R programming language, so familiarity with R is helpful. Students are encouraged to take advantage of the PSPG R programming bootcamp

Restrictions: None

Activities: Lecture, Project, Workshop

This course provides a foundation in modern biostatistical methods and statistical reasoning for pharmaceutical sciences research. The course will explore common data types and distributions, experimental design, exploratory data analysis, methods for hypothesis testing (both parametric and non-parametric), and model-building and comparison. During this hands-on course, students will reinforce their understanding by implementing what they have learned in R.

School: Graduate Division

Department: Pharmaceutical Science And Pharmacogenomics Prog

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? No

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No

BIOSTAT 273 Introduction to Biostatistics (1 Units) Fall

Instructor(s): David Quigley

Prerequisite(s): None

Restrictions: None

Activities: Web work, Workshop

This course provides an introduction to biostatistical methods. The course emphasizes practical considerations required to design studies, perform elementary analysis, and become an informed consumer of statistical data. Topics include study design, exploratory data analysis, the P value and hypothesis testing, power analysis, and reproducible analysis methods using the R statistical environment.

School: Graduate Division

Department: Pharmaceutical Science And Pharmacogenomics Prog

May the student choose the instructor for this course? No

Does enrollment in this course require instructor approval? No

Course Grading Convention: P/NP (Pass/Not Pass) or S/U (Satisfactory/Unsatisfactory)

Graduate Division course: Yes

Is this a web-based online course? Yes

Is this an Interprofessional Education (IPE) course? No

May students in the Graduate Division (i.e. pursuing Master or PhD) enroll in this course? Yes

Repeat course for credit? No