**Biostatistics (BST)**

**BST 222 — Biostatistics: Survival Analysis (4 units)**

*Course Description:* Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials.

*Prerequisite(s):* BST 223 or STA 223; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 222.

*Grade Mode:* Letter.

**BST 223 — Biostatistics: Generalized Linear Models (4 units)**

*Course Description:* Categorical data; logistic regression; Poisson regression; bioassay; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 223.

*Grade Mode:* Letter.

**BST 224 — Analysis of Longitudinal Data (4 units)**

*Course Description:* Analysis of longitudinal data in biostatistical and statistical settings.

*Prerequisite(s):* BST 222 or STA 222; BST 223 or STA 223; STA 232B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 224.

*Grade Mode:* Letter.

**BST 225 — Clinical Trials (4 units)**

*Course Description:* Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials.

*Prerequisite(s):* BST 223 or STA 223; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 225.

*Grade Mode:* Letter.

**BST 226 — Statistical Methods for Bioinformatics (4 units)**

*Course Description:* Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of -omics data.

*Prerequisite(s):* BST 131C or consent of instructor; data analysis experience recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 226.

*Grade Mode:* Letter.

**BST 227 — Machine Learning in Genomics (4 units)**

*Course Description:* Emerging problems in molecular biology and current machine learning-based solutions to those problem. How deep learning, kernel methods, graphical models, feature selection, non-parametric models and other techniques can be applied to application areas such as gene editing, gene network inference and analysis, chromatin state inference, cancer genomics and single cell genomics.

*Prerequisite(s):* STA 208 or ECS 171; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

**BST 228 — Biostatistics (Graduate Group)**

**Graduate Studies**

**Group Office**

4118 Mathematical Sciences Building; Biostatistics Graduate Group (https://biostat.ucdavis.edu/)

**Advising Resources.** Graduate Advisors (https://biostatistics.sf.ucdavis.edu/grad/graduate-advisers/)

**Faculty**

Danielle Harvey, Ph.D. (Public Health Sciences), Chairperson of the Group

Faculty Directory (https://biostatistics.ucdavis.edu/people/)

**About**

The Graduate Group in Biostatistics offers M.S. and Ph.D. programs in Biostatistics.

- Biostatistics, Master of Science (https://catalog.ucdavis.edu/departments-programs-degrees/biostatistics/biostatistics-ms/)
- Biostatistics, Doctor of Philosophy (https://catalog.ucdavis.edu/departments-programs-degrees/biostatistics/biostatistics-phd/)

**Graduate Advisors**

Biostatistics Graduate Group (https://biostatistics.ucdavis.edu/people/)

**Advising Resources.** Graduate Advisors (https://biostatistics.sf.ucdavis.edu/grad/graduate-advisers/)

**Biostatistics (BST)**

**BST 222 — Biostatistics: Survival Analysis (4 units)**

*Course Description:* Biological data; life tables; nonparametric methods; parametric methods; accelerated failure time models; proportional hazards models; partial likelihood; advanced topics.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 222.

*Grade Mode:* Letter.

**BST 223 — Biostatistics: Generalized Linear Models (4 units)**

*Course Description:* Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs.

*Prerequisite(s):* STA 131C.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 223.

*Grade Mode:* Letter.

**BST 224 — Analysis of Longitudinal Data (4 units)**

*Course Description:* Standard and advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings.

*Prerequisite(s):* BST 222 or STA 222; BST 223 or STA 223; STA 232B; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 224.

*Grade Mode:* Letter.

**BST 225 — Clinical Trials (4 units)**

*Course Description:* Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials.

*Prerequisite(s):* BST 223 or STA 223; or consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 225.

*Grade Mode:* Letter.

**BST 226 — Statistical Methods for Bioinformatics (4 units)**

*Course Description:* Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of -omics data.

*Prerequisite(s):* BST 131C or consent of instructor; data analysis experience recommended.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Cross Listing:* STA 226.

*Grade Mode:* Letter.

**BST 227 — Machine Learning in Genomics (4 units)**

*Course Description:* Emerging problems in molecular biology and current machine learning-based solutions to those problem. How deep learning, kernel methods, graphical models, feature selection, non-parametric models and other techniques can be applied to application areas such as gene editing, gene network inference and analysis, chromatin state inference, cancer genomics and single cell genomics.

*Prerequisite(s):* STA 208 or ECS 171; or consent of instructor.

*Learning Activities:* Lecture/Discussion 3 hour(s), Project.

*Grade Mode:* Letter.

**BST 252 — Advanced Topics in Biostatistics (4 units)**

*Course Description:* Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics.

*Prerequisite(s):* BST 222; BST 223.

*Learning Activities:* Lecture 3 hour(s), Discussion/Laboratory 1 hour(s).

*Repeat Credit:* May be repeated when topic differs with consent of advisor.

*Cross Listing:* STA 252.

*Grade Mode:* Letter.

**BST 290 — Seminar in Biostatistics (1 unit)**

*Course Description:* Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers.

*Learning Activities:* Seminar 1 hour(s).

*Enrollment Restriction(s):* Restricted to graduate standing.

*Repeat Credit:* May be repeated 12 time(s).

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BST 298 — Directed Group Study (1-5 units)**

*Course Description:* Special topics in Biostatistics appropriate for group study at the graduate level.

*Learning Activities:* Variable 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.
**BST 299 — Special Study for Biostat Graduate Students (1-12 units)**

*Course Description:* Special topics in Biostatistics appropriate for directed individual study on advanced topics not otherwise covered in the Biostatistics curriculum.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**BST 299D — Dissertation Research (1-12 units)**

*Course Description:* Research in Biostatistics under the supervision of major professor.

*Prerequisite(s):* Consent of instructor; advancement to Candidacy for Ph.D.

*Learning Activities:* Variable 3-36 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.