<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
<th>Prerequisite(s)</th>
<th>Course Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BST 225</td>
<td>Clinical Trials (4 units)</td>
<td></td>
<td>BST 223 or STA 223; or consent of instructor.</td>
<td>Basic statistical principles of clinical designs, including bias, randomization,</td>
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<td>blocking, and masking. Practical applications of widely-used designs, including</td>
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<td>dose-finding, comparative and cluster randomization designs. Advanced statistical</td>
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<td>procedures for analysis of data collected in clinical trials.</td>
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<td>BST 226</td>
<td>Statistical Methods for Bioinformatics (4 units)</td>
<td></td>
<td>BST 131C or consent of instructor; data analysis experience recommended.</td>
<td>Standard and advanced statistical methodology, theory, algorithms, and applications</td>
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<td>relevant to the analysis of -omics data.</td>
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<td>BST 227</td>
<td>Machine Learning in Genomics (4 units)</td>
<td></td>
<td>STA 208 or ECS 171; or consent of instructor.</td>
<td>Emerging problems in molecular biology and current machine learning-based solutions</td>
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<td>to those problem. How deep learning, kernel methods, graphical models, feature</td>
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<td>selection, non-parametric models and other techniques can be applied to application</td>
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<td>areas such as gene editing, gene network inference and analysis, chromatin state</td>
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<td>inference, cancer genomics and single cell genomics.</td>
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<td>BST 228</td>
<td>Directed Group Study (1 unit)</td>
<td></td>
<td>BST 225; BST 226; BST 227; or consent of instructor.</td>
<td>Special topics in Biostatistics appropriate for group study at the graduate level.</td>
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<tr>
<td>BST 229</td>
<td>Seminar in Biostatistics (1 unit)</td>
<td></td>
<td>BST 228; BST 229; BST 230; or consent of instructor.</td>
<td>Seminar on advanced topics in the field of biostatistics. Presented by members of</td>
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<tr>
<td>BST 230</td>
<td>Advanced Topics in Biostatistics (4 units)</td>
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<td>BST 228; BST 229; BST 230; or consent of instructor.</td>
<td>Biostatistical methods and models selected from the following: genetics, bioinforma-</td>
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<tr>
<td>BST 231</td>
<td>Analysis of Longitudinal Data (4 units)</td>
<td></td>
<td>BST 228; BST 229; BST 230; or consent of instructor.</td>
<td>tics and genomics; longitudinal or functional data; clinical trials and experimental</td>
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</tbody>
</table>

**Biostatistics (BST)**

**BST 222 — Biostatistics: Survival Analysis (4 units)**
- Course Description: Incomplete 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.