SUSA

Enrollment Advising

Fall 2018

Statistics Major Prerequisites

- Minimum 3.2 GPA and no lower than a C in the following:
  - Math 1A: Calculus
  - Math 1B: Calculus II
  - Math 53: Multivariable Calculus
  - Math 54: Linear Algebra and Differential Equations
  - Stats 20 or Data 8 (Tentative)

B- minimum in either Stat 134/Stat 140* or Stat 135

*Stat 140 *will* be offered in the Spring and Data 8 & Math 1A/1B are hard-prerequisite (and Linear Algebra is a hard-corequisite)

Statistics Major Requirements

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Core Lower-Divs

Elective Upper-Divs

Cluster Courses

Statistics Major Requirements

- 3 Statistics Electives (at least one course must have a lab):
  - **Stat 150** Stochastic Processes
  - **Stat 151A** Linear Modelling: Theory and Applications
  - **Stat 152** (lab) Sampling Surveys
  - **Stat 153** (lab) Introduction to Time Series
  - **Stat 154** (lab) Modern Statistical Prediction and Machine Learning
  - **Stat 155** Game Theory
  - **Stat 157** Seminar on Topics in Probability and Statistics
  - **Stat 158** (lab) The Design and Analysis of Experiments
  - **Stat 159** (lab) Reproducible and Collaborative Statistical Data Science

Statistics Major Requirements

- 3 Core Statistics Courses:
  - **Stat 133** Concepts in Computing with Data
  - **Stat 134** Concepts of Probability
  - **Stat 135** Concepts of Statistics

*And for this semester's freshmen,
  - **Stat 20 or Data 8**

Statistics Major Requirements

- 3 Applied Cluster Courses (at least 3 units):
  - Three upper division courses will be selected, in conjunction with advice from the undergraduate faculty advisor, from a field in which statistics is applied.
    - Possible fields include:
      - Computer Science
      - Math
      - IEOR
      - Business Administration
      - Economics (or Econ & Business combo)
      - Computational Biology

Note: The Teaching Track requires 4 Applied Cluster Courses in Math and 2 Statistics Electives

Approved Cluster Courses that Satisfy L&S Breadth Requirements

- Full list of approved Statistics cluster classes here: http://statistics.berkeley.edu/programs/undergrad/approved-cluster-courses
- Guide for the L&S Seven Course Breadth Requirements here: http://ls-advise.berkeley.edu/requirement/7breadth.html

Example Cluster Combinations

Patrick – CS170, CS188, CS 189 (Computer Science)

Isabelle – Math 110, Math 113, Math 151, Math 152 (Teaching Math)

Arun - Math 118, CS189, Math 110 (Applied Math)

Zhongling - Math 104, CS 189, Math 110 (Math)

Isaac - Econ 101A, Econ 101B, Econ 139 (Economics)

Rick - CS 186, CS 189, EE 127 (Data Science)

Stat 20 - Introduction to Probability & Statistics

- <u>Description</u>: "For students with mathematical background who wish to acquire basic concepts. Relative frequencies, discrete probability, random variables, expectation. Testing hypotheses. Estimation. Illustrations from various fields."
- <u>Prerequisites</u>: None
- <u>Discussion Section</u>: No

<u>Lec 1</u>: Fletcher Ibser; Tu/Thur 9:30 - 11 am
- Class Size: 400
- When should I sign up?
  - Phase 2

Stat 133 - Concepts in Computing Data

- <u>Description</u>: "An introduction to computationally intensive applied statistics. Topics will include organization and use of databases, visualization and graphics, statistical learning and data mining, model validation procedures, and the presentation of results."
- <u>Prerequisites</u>: None
- <u>Discussion Section</u>: Yes (1 hour/week)
- <u>Lec 1</u>: Sanchez Trujillo; M/W/F 3 - 4 pm @ VSLB 2050
  - Class Size: 361
  - When should I sign up?
    - Phase 2

Stat 134 - Concepts of Probability

- <u>Description</u>: "An introduction to probability, emphasizing concepts and applications. Conditional expectation, independence, laws of large numbers. Discrete and continuous random variables. Central limit theorem. Selected topics such as the Poisson process, Markov chains, characteristic functions."
- <u>Prerequisites</u>: One year of calculus; will not receive credit after taking 101 or 201A
- <u>Discussion Section</u>: Yes (1 hour/week)
- <u>Lec 1</u>: Lucas; M/W/F 1 - 2pm @ Dwinelle 155
  - Class Size: 396
  - When should I sign up?
    - Phase 1

Stat 140 - Probability for Data Science

- <u>Description</u>: "An introduction to probability, emphasizing the combined use of mathematics and programming to solve problems. Random variables, discrete and continuous families of distributions. Bounds and approximations. Dependence, conditioning, Bayes methods. Convergence, Markov chains. Least squares prediction. Random permutations, symmetry, order statistics. Use of numerical computation, graphics, simulation, and computer algebra."
- NOTE: YOU CAN ONLY TAKE STAT 140 OR STAT 134 FOR CREDIT
- <u>Prerequisites</u>: One year of calculus, Math 54 or EE16A or Math 110, and Data 8 (Note: prereqs are usually strictly enforced for this class)
- <u>Discussion/Lab Section</u>: Yes (1 hour/wk)
- <u>Lec 1</u>: Adhikari; Tu/Thur from 5 - 6:30 PM @ VLSB 2050
  - Class Size: 240
  - When should I sign up?
    - Phase 1

Stat 135 - Concepts of Statistics

- <u>Description</u>: "A comprehensive survey course in statistical theory and methodology. Topics include descriptive statistics, maximum likelihood estimation, non-parametric methods, introduction to optimality, goodness-of-fit tests, analysis of variance, bootstrap and computer-intensive methods and least squares estimation. The laboratory includes computer-based data-analytic applications to science and engineering."
- <u>Prerequisites</u>: Stats 134 and linear algebra (Math 54 or equivalent). Stats 133 strongly recommended.
- <u>Discussion Section</u>: Yes (2 hours/week)
- <u>Lec 1</u>: Lucas; M/W/F 11:00 am -12:00 pm @ Evans 10
  - Class Size: 210
  - When should I sign up?
    - Phase 1
    -

Stat 150 - Stochastic Processes

- <u>Description</u>: Random walks, discrete Markov chains, Poisson processes. Further topics such as: continuous time Markov chains, queuing theory, point processes, branching processes, renewal theory, stationary processes, Gaussian processes.
- <u>Prerequisites</u>: Stats 101 or 103A or 134.
- <u>Discussion Section</u>: No

- <u>Lec 1</u>: Klass; M/W/F 1-2 PM @ Stanley 106
  - Class Size: 70
  - When should I sign up?
    - Phase 1

Stat 151A - Linear Modeling: Theory and Applications

- <u>Description</u>: "A coordinated treatment of linear and generalized linear models and their application. Linear regression, analysis of variance and covariance, random effects, design and analysis of experiments, quality improvement, log-linear models for discrete multivariate data, model selection, robustness, graphical techniques, productive use of computers, in-depth case studies."
- <u>Prerequisites</u>: Stats 102 or 135. 133 recommended.
- <u>Discussion Section</u>: Yes (2 hours/week)

- <u>Lec 1</u>: Madrid Padilla; T/TH 5:00 - 6:30 pm @ Hearst Mining 390
  - Class Size: 140
  - When should I sign up?
    - Phase 1

Stat 152 - Sampling Surveys

- <u>Description</u>: Theory and practice of sampling from finite population. Simple random, stratified, cluster, and double sampling. Sampling with unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex samples.
- <u>Prerequisites</u>: Stats 102 or 134. 133 and 135 recommended.
- <u>Discussion Section</u>: Yes (2 hours/week)

- <u>Lec 1</u>: Purdom; T/TH 11 - 12:30 pm @ Etcheverry 3108
  - Class Size: 70
  - When should I sign up?
    - Phase 1

Stat 153 - Introduction to Time Series

- <u>Description</u>: "An introduction to time series analysis in the time domain and spectral domain. Topics will include: estimation of trends and seasonal effects, autoregressive moving average models, forecasting, indicators, harmonic analysis, spectra."
- <u>Prerequisites</u>: Stats 101, 134 or consent of instructor. 133 or 135 recommended
- <u>Discussion Section</u>: Yes (2 hours/week)

- <u>Lec 1</u>: Behr; T/TH 2 - 3:30 pm @ Hearst Mining 390
  - Class Size: 140
  - When should I sign up?
    - Phase 1

Stat 154 - Modern Statistical Prediction and Machine Learning

- <u>Description</u>: "Theory and practice of statistical prediction. Contemporary methods as extensions of classical methods. Topics: optimal prediction rules, the curse of dimensionality, empirical risk, linear regression and classification, basis expansions, regularization, splines, the bootstrap, model selection, classification and regression trees, boosting, support vector machines. Computational efficiency versus predictive performance. Emphasis on experience with real data and assessing statistical assumptions."
- <u>Prerequisites</u>: Math 53 and 54 or equivalents; Stats 135 or equivalent; experience with some programming language. Math 55 or equivalent exposure to counting arguments is recommended but not required.
- <u>Discussion Section</u>: Yes (2 hours/week)

- <u>Lec 1</u>: Yu; T/TH 8 - 9:30 AM @ VLSB 2040
  - Class Size: 140
  - When should I sign up?
    - Phase 1

Stat 155 - Game Theory

- <u>Description</u>: "General theory of zero-sum, two-person games, including games in extensive form and continuous games, and illustrated by detailed study of examples."
- <u>Prerequisites</u>: Stats 101 or 134
- <u>Discussion Section</u>: Strongly recommended supplemental section (1 hour/week)

- <u>Lec 1</u>: Murali Stoyanov; T/TH 2 - 3:30 pm @ Evans 60
  - Class Size: 70 (all seats reserved for stats majors)
  - When should I sign up?
    - Phase 1

Stat 157 - Seminar on Topics in Probability and Statistics

- <u>Description</u>: "Substantial student participation required. The topics to be covered each semester that the course may be offered will be announced by the middle of the preceding semester; see departmental bulletins. Recent topics include: Baynesian statistics, statistics and finance, random matrix theory, high-dimensional statistics."
- <u>Prerequisites</u>: Math 53, 54, Stats 134, 135. Knowledge of scientific computing environment (R or Matlab) often required. Prerequisites might vary with instructor and topics.

- <u>Not offered next semester</u>

Stat 158 - The Design and Analysis of Experiments

- <u>Description</u>: An introduction to the design and analysis of experiments. This course covers planning, conducting, and analyzing statistically designed experiments with an emphasis on hands-on experience. Standard designs studied include factorial designs, block designs, latin square designs, and repeated measures designs. Other topics covered include the principles of design, randomization, ANOVA, response surface methodology, and computer experiments.
- <u>Prerequisites</u>: Stats 134 and 135, 133 recommended
- <u>Discussion Section</u>: Two hours of lab per week

- <u>Lec 1</u>: Pimentel; T/TH 9:30 - 11 am @ Etcheverry 3106
    - Class Size: 70 (all seats reserved for stats majors)
    - When should I sign up?
        - Phase 1

Stat 159 - Reproducible and Collaborative Data Science

- <u>Description</u>: A project-based introduction to statistical data analysis. Through case studies, computer laboratories, and a term project, students will learn practical techniques and tools for producing statistically sound and appropriate, reproducible, and verifiable computational answers to scientific questions. Course emphasizes version control, testing, process automation, code review, and collaborative programming. Software tools may include Bash, Git, Python, and LaTeX.
- <u>Prerequisites</u>: Stat 133, 134, and 135 (or equivalent)
- <u>Discussion Section</u>: Two hours of lab per week

- <u>Not offered next semester</u>

Prerequisites and Corequisites

The following courses will have prerequisites and corequisites enforced:

- Data 100
- Stat 135
- Stat 140
- Stat 151A
- Stat 154

Note: For courses with corequisites, you must be enrolled in the corequisite class before enrolling in the course

Earning Honors

- Have a 3.3 GPA or higher in the major, in upper division major courses, and overall.
- Enroll in Statistics H195 and write a satisfactory thesis under the direction of a Statistics faculty member.
- ***You must find a faculty member to be your Honors Thesis Advisor *BEFORE* enrolling in Stats H195.
  - Acts more like an independent study course and is only offered if a faculty member has agreed to serve as a thesis advisor

Hints/Tips for Scheduling

- Find a class you like and are interested in
- Check to see if you fulfill the requirements
- Make sure the professor is good (Check online for ratings; ask in Slack or attend a current class for a day)
- Make sure the class and final exam times do not conflict with any other required courses
- Use [Berkeley Time](#) to help determine Phase I or II

Hints/Tips for Scheduling

Then, once you have decided which courses you can/wish to take:

1. Sign up for your required courses in Phase I
2. Sign up for your favored secondary courses Phase II
   - If your favored secondary course is full, sign up for waitlist and sign up for a different class; there is no point holding back from signing up for another class and hoping to get in the waitlisted course

Tentative Courses Being Offered Spring 2019

- 150
- 151A
- 152
- 153
- 154
- 155
- 158

Q&A

Any Questions?

For further FAQs, visit:
http://statistics.berkeley.edu/programs/undergrad/major/faq