Statistics (STAT)

Courses

STAT 0PX Preparatory Statistics 1 Unit
Terms offered: Summer 2016 10 Week Session, Summer 2015 10 Week Session, Summer 2014 10 Week Session
This course assists entering Freshman students with basic statistical concepts and problem solving. Designed for students who do not meet the prerequisites for 2. Offered through the Student Learning Center.
Preparatory Statistics: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Summer:
6 weeks - 5 hours of lecture and 4.5 hours of workshop per week
8 weeks - 5 hours of lecture and 4.5 hours of workshop per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam required.

Instructor: Purves

Preparatory Statistics: Read Less [-]

STAT 2 Introduction to Statistics 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017, Fall 2016
Introduction to Statistics: Read More [+]

Rules & Requirements

Credit Restrictions: Students who have taken 2X, 5, 20, 21, 21X, or 25 will receive no credit for 2.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 2-2 hours of laboratory per week
Summer: 8 weeks - 5 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Also listed as: COMPSCI C8/INFO C8

Foundations of Data Science: Read Less [-]

STAT C8 Foundations of Data Science 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017, Fall 2016
Foundations of data science from three perspectives: inferential thinking, computational thinking, and real-world relevance. Given data arising from some real-world phenomenon, how does one analyze that data so as to understand that phenomenon? The course teaches critical concepts and skills in computer programming and statistical inference, in conjunction with hands-on analysis of real-world datasets, including economic data, document collections, geographical data, and social networks. It delves into social and legal issues surrounding data analysis, including issues of privacy and data ownership.
Foundations of Data Science: Read More [+]

Rules & Requirements

Prerequisites: This course may be taken on its own, but students are encouraged to take it concurrently with a data science connector course (numbered 88 in a range of departments)

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 2-2 hours of laboratory per week
Summer: 8 weeks - 6 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Also listed as: COMPSCI C8/INFO C8

Foundations of Data Science: Read Less [-]
STAT C8R Introduction to Computational Thinking with Data 3 Units
Terms offered: Not yet offered
An introduction to computational thinking and quantitative reasoning, preparing students for further coursework, especially Foundations of Data Science (CS/Info/Stat C8). Emphasizes the use of computation to gain insight about quantitative problems with real data. Expressions, data types, collections, and tables in Python. Programming practices, abstraction, and iteration. Visualizing univariate and bivariate data with bar charts, histograms, plots, and maps. Introduction to statistical concepts including averages and distributions, predicting one variable from another, association and causality, probability and probabilistic simulation. Relationship between numerical functions and graphs. Sampling and introduction to inference.

Objectives Outcomes

Course Objectives: C8R also includes quantitative reasoning concepts that aren't covered in Data 8. These include certain topics in: principles of data visualization; simulation of random processes; and understanding numerical functions through their graphs. This will help prepare students for computational and quantitative courses other than Data 8. C8R takes advantage of the complementarity of computing and quantitative reasoning to enliven abstract ideas and build students' confidence in their ability to solve real problems with quantitative tools. Students learn computer science concepts and immediately apply them to plot functions, visualize data, and simulate random events.

Foundations of Data Science (CS/Info/Stat C8, a.k.a. Data 8) is an increasingly popular class for entering students at Berkeley. Data 8 builds students' computing skills in the first month of the semester, and students rely on these skills as the course progresses. For some students, particularly those with little prior exposure to computing, developing these skills benefits from further time and practice. C8R is a rapid introduction to Python programming, visualization, and data analysis, which will prepare students for success in Data 8.

Student Learning Outcomes: Students will be able to perform basic computations in Python, including working with tabular data. Students will be able to understand basic probabilistic simulations. Students will be able to understand the syntactic structure of Python code. Students will be able to use good practices in Python programming. Students will be able to use visualizations to understand univariate data and to identify associations or causal relationships in bivariate data.

Rules & Requirements

Credit Restrictions: Students who have taken COMPSCI/INFO/STAT C8 will receive no credit for COMPSCI/STAT C8R.

Hours & Format

Summer: 6 weeks - 4 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Adhikari
Also listed as: COMPSCI C8R

Introduction to Computational Thinking with Data: Read More [+]

STAT 20 Introduction to Probability and Statistics 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017
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.

Introduction to Probability and Statistics: Read More [+]

Rules & Requirements

Prerequisites: One semester of calculus

Credit Restrictions: Students will receive no credit for Statistics 21 after completing Statistics 2, 2X, 5, 20, 21X, N21, W21 or 25 . A deficiency in Statistics 21 may be moved by taking W21.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Summer: 8 weeks - 6 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Introductory Probability and Statistics for Business: Read Less [-]

STAT 21 Introductory Probability and Statistics for Business 4 Units
Terms offered: Fall 2016, Fall 2015, Fall 2014
Descriptive statistics, probability models and related concepts, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments vs. observational studies, correlation and regression.

Introductory Probability and Statistics for Business: Read More [+]

Rules & Requirements

Prerequisites: One semester of calculus

Credit Restrictions: Students will receive no credit for Statistics 21 after completing Statistics 2, 2X, 5, 20, 21X, N21, W21 or 25 . A deficiency in Statistics 21 may be moved by taking W21.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Summer: 8 weeks - 5 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Introductory Probability and Statistics for Business: Read Less [-]
STAT W21 Introductory Probability and Statistics for Business 4 Units
Terms offered: Summer 2017 8 Week Session, Spring 2017, Summer 2016 10 Week Session
Reasoning and fallacies, descriptive statistics, probability models and related concepts, combinatorics, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments vs. observational studies, correlation and regression.
Introductory Probability and Statistics for Business: Read More [+]

Rules & Requirements

Prerequisites: One semester of calculus
Credit Restrictions: Students will receive no credit for Statistics W21 after completing Statistics 2, 20, 21, N21 or 25. A deficient grade in Statistics 21, N21 may be removed by taking Statistics W21.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of web-based lecture per week
Summer: 8 weeks - 7.5 hours of web-based lecture per week
Online: This is an online course.

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: N21

Introductory Probability and Statistics for Business: Read Less [-]

STAT 28 Statistical Methods for Data Science 4 Units
Terms offered: Spring 2017
This is a lower-division course that is a follow-up to STAT8/CS8 (Foundations of Data Science). The course will teach a broad range of statistical methods that are used to solve data problems. Topics will include group comparisons and ANOVA, standard parametric statistical models, multivariate data visualization, multiple linear regression and classification, classification and regression trees and random forests. An important focus of the course will be on statistical computing and reproducible statistical analysis. The students will be introduced to the widely used R statistical language and they will obtain hands-on experience in implementing a range of commonly used statistical methods on numerous real world datasets.
Statistical Methods for Data Science: Read More [+]

Rules & Requirements

Prerequisites: Statistics/Information/Computer Science C8 is the only course prerequisite. In addition, mathematical fluency and comfort at the level of precalculus (Math 32) is expected

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Statistical Methods for Data Science: Read Less [-]

STAT 39D Freshman/Sophomore Seminar 2 - 4 Units
Terms offered: Fall 2008, Fall 2007
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley seminars are offered in all campus departments, and topics vary from department to department and semester to semester. Enrollment limited to 15 freshmen.
Freshman/Sophomore Seminar: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit as topic varies. Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman/Sophomore Seminar: Read Less [-]
STAT C79 Societal Risks and the Law 3 Units
Terms offered: Spring 2013
Defining, perceiving, quantifying and measuring risk; identifying risks and estimating their importance; determining whether laws and regulations can protect us from these risks; examining how well existing laws work and how they could be improved; evaluating costs and benefits. Applications may vary by term. This course cannot be used to complete engineering unit or technical elective requirements for students in the College of Engineering.
Societal Risks and the Law: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.

Also listed as: COMPSCI C79/POL SCI C79

STAT 88 Probability and Mathematical Statistics in Data Science 2 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
In this connector course we will state precisely and prove results discovered in the foundational data science course through working with data. Topics include: total variation distance between discrete distributions; the mean, standard deviation, and tail bounds; correlation, and the derivation of the regression equation; probabilities, random variables, and the Central Limit Theorem; probabilistic models; symmetries in random permutations; prior and posterior distributions, and Bayes' rule.
Probability and Mathematical Statistics in Data Science: Read More [+]

Rules & Requirements
Prerequisites: One semester of calculus. This course is meant to be taken concurrently with Computer Science C8/Statistics C8/Information C8. Students may take more than one data science connector course if they wish, ideally concurrently with or after having taken the C8 course

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Introduction to Matrices and Graphs in Data Science: Read Less [-]

STAT 94 Special Topics in Probability and Statistics 1 - 4 Units
Terms offered: Fall 2015
Topics will vary semester to semester. Special Topics in Probability and Statistics: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of lecture and 0-2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Special Topics in Probability and Statistics: Read Less [-]
STAT 97 Field Study in Statistics 1 - 3 Units
Terms offered: Fall 2015, Spring 2012
Supervised experience relevant to specific aspects of statistics in off-campus settings. Individual and/or group meetings with faculty.
Field Study in Statistics: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of fieldwork per week
Summer:
6 weeks - 2.5-7.5 hours of fieldwork per week
8 weeks - 1.5-5.5 hours of fieldwork per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Field Study in Statistics: Read Less [-]

STAT C100 Principles & Techniques of Data Science 4 Units
Terms offered: Fall 2017, Spring 2017
In this course, students will explore the data science lifecycle, including question formulation, data collection and cleaning, exploratory data analysis and visualization, statistical inference and prediction, and decision-making. This class will focus on quantitative critical thinking and key principles and techniques needed to carry out this cycle. These include languages for transforming, querying and analyzing data; algorithms for machine learning methods including regression, classification and clustering; principles behind creating informative data visualizations; statistical concepts of measurement error and prediction; and techniques for scalable data processing.
Principles & Techniques of Data Science: Read More [+]
Rules & Requirements
Prerequisites: Computer Science/Information/Statistics C8 or Engineering 7; and either Computer Science 61A or Computer Science 88. Corequisite: Mathematics 54 or Electrical Engineering 16A
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture, 1 hour of discussion, and 1 hour of laboratory per week
Summer:
8 weeks - 5 hours of lecture and 4 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Also listed as: COMPSCI C100
Principles & Techniques of Data Science: Read Less [-]

STAT 98 Directed Group Study 1 - 3 Units
Terms offered: Fall 2014, Fall 2013, Spring 2013
Must be taken at the same time as either Statistics 2 or 21. This course assists lower division statistics students with structured problem solving, interpretation and making conclusions.
Directed Group Study: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Hours & Format
Fall and/or spring: 15 weeks - 2-3 hours of directed group study per week
Summer: 8 weeks - 4-6 hours of directed group study per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Directed Group Study: Read Less [-]

STAT 131A Introduction to Probability and Statistics for Life Scientists 4 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Ideas for estimation and hypothesis testing basic to applications, including an introduction to probability, linear estimation and normal regression theory.
Introduction to Probability and Statistics for Life Scientists: Read More [+]
Rules & Requirements
Prerequisites: One semester of calculus or consent of instructor
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Summer: 8 weeks - 5 hours of lecture and 4 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Introduction to Probability and Statistics for Life Scientists: Read Less [-]
STAT 133 Concepts in Computing with Data 3 Units
Terms offered: Fall 2017, Summer 2017 10 Week Session, Spring 2017
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.

Concepts in Computing with Data: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Summer: 10 weeks - 4 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Concepts in Computing with Data: Read Less [-]

STAT 134 Concepts of Probability 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017
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.

Concepts of Probability: Read More [+]

Rules & Requirements

Prerequisites: One year of calculus

Credit Restrictions: Students will not receive credit for 134 after taking 140 or 201A.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week
Summer: 8 weeks - 6 hours of lecture and 4 hours of discussion per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Concepts of Probability: Read Less [-]

STAT 135 Concepts of Statistics 4 Units
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017
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.

Concepts of Statistics: Read More [+]

Rules & Requirements

Prerequisites: Statistics 134 and linear algebra (Mathematics 54 or equivalent). Statistics 133 strongly recommended

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Summer: 8 weeks - 6 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Concepts of Statistics: Read Less [-]
**STAT 140 Probability for Data Science 4 Units**  
**Terms offered:** Spring 2017  
**Probability for Data Science: Read More [-]**  
**Objectives Outcomes**

**Course Objectives:** The emphasis on simulation and the bootstrap in Data 8 gives students a concrete sense of randomness and sampling variability. Stat 140 will capitalize on this, abstraction and computation complementing each other throughout.  

The syllabus has been designed to maintain a mathematical level at least equal to that in Stat 134. So Stat 140 will start faster than Stat 134 (due to the Data 8 prerequisite), avoid approximations that are unnecessary when SciPy is at hand, and replace some of the routine calculus by symbolic math done in SymPy. This will create time for a unit on the convergence and reversibility of Markov Chains as well as added focus on conditioning and Bayes methods.  

With about a thousand students a year taking Foundations of Data Science (Stat/CS/Info C8, a.k.a. Data 8), there is considerable demand for follow-on courses that build on the skills acquired in that class. Stat 140 is a probability course for Data 8 graduates who have also had a year of calculus and wish to go deeper into data science.  

**Student Learning Outcomes:** Understand the difference between math and simulation, and appreciate the power of both  
Use a variety of approaches to problem solving  
Work with probability concepts algebraically, numerically, and graphically  

**Rules & Requirements**

**Prerequisites:** Stat/CS/Info C8 and one year of calculus  

**Credit Restrictions:** Students who have earned credit for Stat 134 will not receive credit for Stat 140.  

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week  

**Additional Details**

**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.  

Probability for Data Science: Read Less [-]  

**STAT 150 Stochastic Processes 3 Units**  
**Terms offered:** Fall 2017, Fall 2016, Spring 2016  
Random walks, discrete time Markov chains, Poisson processes. Further topics such as: continuous time Markov chains, queueing theory, point processes, branching processes, renewal theory, stationary processes, Gaussian processes.  

**Stochastic Processes: Read More [+]**  
**Rules & Requirements**

**Prerequisites:** 101 or 103A or 134  

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture per week  

**Additional Details**

**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.  

Stochastic Processes: Read Less [-]  

**STAT 151A Linear Modelling: Theory and Applications 4 Units**  
**Terms offered:** Fall 2017, Spring 2017, Fall 2016  
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.  

**Linear Modelling: Theory and Applications: Read More [+]**  
**Rules & Requirements**

**Prerequisites:** 102 or 135. 133 recommended  

**Hours & Format**

**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of laboratory per week  

**Additional Details**

**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.  

Linear Modelling: Theory and Applications: Read Less [-]
**STAT 152 Sampling Surveys 4 Units**  
Terms offered: Spring 2017, Spring 2016, Spring 2015  
Sampling Surveys: Read More [+]

**Rules & Requirements**  
**Prerequisites:** 101 or 134. 133 and 135 recommended

**Hours & Format**  
**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

**Additional Details**  
**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.

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**STAT 153 Introduction to Time Series 4 Units**  
Terms offered: Fall 2017, Spring 2017, Fall 2016  
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.  
Introduction to Time Series: Read More [+]

**Rules & Requirements**  
**Prerequisites:** 101, 134 or consent of instructor. 133 or 135 recommended

**Hours & Format**  
**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of laboratory per week  
**Summer:** 10 weeks - 4.5 hours of lecture and 3 hours of laboratory per week

**Additional Details**  
**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.

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**STAT 154 Modern Statistical Prediction and Machine Learning 4 Units**  
Terms offered: Fall 2017, Spring 2017, Fall 2016  
Modern Statistical Prediction and Machine Learning: Read More [+]

**Rules & Requirements**  
**Prerequisites:** Mathematics 53 and 54 or equivalents; Statistics 135 or equivalent; experience with some programming language. Mathematics 55 or equivalent exposure to counting arguments is recommended but not required

**Hours & Format**  
**Fall and/or spring:** 15 weeks - 3 hours of lecture and 2 hours of laboratory per week  
**Summer:** 10 weeks - 4.5 hours of lecture and 3 hours of laboratory per week

**Additional Details**  
**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.

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**STAT 155 Game Theory 3 Units**  
Terms offered: Fall 2017, Summer 2017 8 Week Session, Spring 2017  
General theory of zero-sum, two-person games, including games in extensive form and continuous games, and illustrated by detailed study of examples.  
Game Theory: Read More [+]

**Rules & Requirements**  
**Prerequisites:** 101 or 134

**Hours & Format**  
**Fall and/or spring:** 15 weeks - 3 hours of lecture per week  
**Summer:** 8 weeks - 6 hours of lecture per week

**Additional Details**  
**Subject/Course Level:** Statistics/Undergraduate  
**Grading/Final exam status:** Letter grade. Final exam required.

Game Theory: Read Less [-]
STAT 157 Seminar on Topics in Probability and Statistics 3 Units
Terms offered: Fall 2017, Fall 2016, Spring 2016
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: Bayesian statistics, statistics and finance, random matrix theory, high-dimensional statistics.
Seminar on Topics in Probability and Statistics: Read More [+]
Rules & Requirements
Prerequisites: Mathematics 53-54, Statistics 134, 135. Knowledge of scientific computing environment (R or Matlab) often required.
Prerequisites might vary with instructor and topics
Repeat rules: Course may be repeated for credit with consent of instructor. Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Seminar on Topics in Probability and Statistics: Read Less [-]

STAT 158 The Design and Analysis of Experiments 4 Units
Terms offered: Spring 2016, Spring 2015, Fall 2013
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.
The Design and Analysis of Experiments: Read More [+]
Rules & Requirements
Prerequisites: Statistics 134 and 135 or consent of instructor. Statistics 135 may be taken concurrently. Statistics 133 is recommended

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
The Design and Analysis of Experiments: Read Less [-]

STAT 159 Reproducible and Collaborative Statistical Data Science 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
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.
Reproducible and Collaborative Statistical Data Science: Read More [+]
Rules & Requirements
Prerequisites: Statistics 133, Statistics 134, and Statistics 135 (or equivalent)

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Reproducible and Collaborative Statistical Data Science: Read Less [-]

STAT H195 Special Study for Honors Candidates 1 - 4 Units
Terms offered: Spring 2015, Fall 2014, Fall 2010
Special Study for Honors Candidates: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Summer:
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Special Study for Honors Candidates: Read Less [-]
STAT 197 Field Study in Statistics 1 - 3 Units
Terms offered: Summer 2017 8 Week Session, Spring 2017, Fall 2015
Supervised experience relevant to specific aspects of statistics in off-campus settings. Individual and/or group meetings with faculty.
Field Study in Statistics: Read More [+]
Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of fieldwork per week
Summer:
6 weeks - 3-8 hours of fieldwork per week
8 weeks - 2-6 hours of fieldwork per week
10 weeks - 1.5-4.5 hours of fieldwork per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Field Study in Statistics: Read Less [-]

STAT 198 Directed Study for Undergraduates 1 - 3 Units
Terms offered: Spring 2016, Fall 2015, Spring 2015
Special tutorial or seminar on selected topics.
Directed Study for Undergraduates: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of directed group study per week
Summer:
6 weeks - 2.5-7.5 hours of directed group study per week
8 weeks - 1.5-5.5 hours of directed group study per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Directed Study for Undergraduates: Read Less [-]

STAT 199 Supervised Independent Study and Research 1 - 3 Units
Terms offered: Spring 2017, Fall 2015, Spring 2015
Supervised Independent Study and Research: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 1-3 hours of independent study per week
Summer:
6 weeks - 1-4 hours of independent study per week
8 weeks - 1-3 hours of independent study per week
10 weeks - 1-3 hours of independent study per week
Additional Details
Subject/Course Level: Statistics/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.
Supervised Independent Study and Research: Read Less [-]

STAT 200A Introduction to Probability and Statistics at an Advanced Level 4 Units
Terms offered: Fall 2011, Fall 2010, Fall 2009
Probability spaces, random variables, distributions in probability and statistics, central limit theorem, Poisson processes, transformations involving random variables, estimation, confidence intervals, hypothesis testing, linear models, large sample theory, categorical models, decision theory.
Introduction to Probability and Statistics at an Advanced Level: Read More [+]
Rules & Requirements
Prerequisites: Multivariable calculus and one semester of linear algebra
Credit Restrictions: Students will receive no credit for Statistics 200A after completing Statistics 201A-201B.
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Introduction to Probability and Statistics at an Advanced Level: Read Less [-]
**STAT 200B Introduction to Probability and Statistics at an Advanced Level 4 Units**
Terms offered: Spring 2012, Spring 2011, Spring 2010
Probability spaces, random variables, distributions in probability and statistics, central limit theorem, Poisson processes, transformations involving random variables, estimation, confidence intervals, hypothesis testing, linear models, large sample theory, categorical models, decision theory.
Introduction to Probability and Statistics at an Advanced Level: Read More [+]

**Rules & Requirements**

**Prerequisites:** Multivariable calculus and one semester of linear algebra

**Credit Restrictions:** Students will receive no credit for Statistics 200A-200B after completing Statistics 201A-201B.

**Hours & Format**
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Statistics/Graduate

**Grading:** Letter grade.

Introduction to Probability and Statistics at an Advanced Level: Read Less [-]

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**STAT 201A Introduction to Probability at an Advanced Level 4 Units**
Terms offered: Fall 2017, Fall 2016, Fall 2015
Distributions in probability and statistics, central limit theorem, Poisson processes, modes of convergence, transformations involving random variables.
Introduction to Probability at an Advanced Level: Read More [+]

**Rules & Requirements**

**Prerequisites:** Multivariable calculus, one semester of linear algebra, and Statistics 134 or consent of instructor

**Credit Restrictions:** Students will receive no credit for 201A after taking 200A.

**Hours & Format**
Fall and/or spring: 7 weeks - 6 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Statistics/Graduate

**Grading:** Letter grade.

Introduction to Probability at an Advanced Level: Read Less [-]

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**STAT 201B Introduction to Statistics at an Advanced Level 4 Units**
Terms offered: Fall 2017, Fall 2016, Fall 2015
Estimation, confidence intervals, hypothesis testing, linear models, large sample theory, categorical models, decision theory.
Introduction to Statistics at an Advanced Level: Read More [+]

**Rules & Requirements**

**Prerequisites:** Statistics 200A, Statistics 201A, or consent of instructor

**Credit Restrictions:** Students will receive no credit for Statistics 201B after completing Statistics 200B.

**Hours & Format**
Fall and/or spring: 7 weeks - 6 hours of lecture and 3 hours of laboratory per week

**Additional Details**

**Subject/Course Level:** Statistics/Graduate

**Grading:** Letter grade.

Introduction to Statistics at an Advanced Level: Read Less [-]

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**STAT 204 Probability for Applications 4 Units**
Terms offered: Spring 2017, Spring 2015, Fall 2012
A treatment of ideas and techniques most commonly found in the applications of probability: Gaussian and Poisson processes, limit theorems, large deviation principles, information, Markov chains and Markov chain Monte Carlo, martingales, Brownian motion and diffusion.
Probability for Applications: Read More [+]

**Rules & Requirements**

**Credit Restrictions:** Students will receive no credit for Statistics 204 after completing Statistics 205A-205B.

**Hours & Format**
Fall and/or spring: 15 weeks - 3 hours of lecture per week

**Additional Details**

**Subject/Course Level:** Statistics/Graduate

**Grading:** Letter grade.

**Instructor:** Evans

Probability for Applications: Read Less [-]
STAT C205A Probability Theory 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
The course is designed as a sequence with Statistics C205B/Mathematics C218B with the following combined syllabus. Measure theory concepts needed for probability. Expectation, distributions. Laws of large numbers and central limit theorems for independent random variables. Characteristic function methods. Conditional expectations, martingales and martingale convergence theorems. Markov chains. Stationary processes. Brownian motion.
Probability Theory: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Also listed as: MATH C218A

Probability Theory: Read Less [-]

STAT C205B Probability Theory 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
The course is designed as a sequence with with Statistics C205A/Mathematics C218A with the following combined syllabus. Measure theory concepts needed for probability. Expectation, distributions. Laws of large numbers and central limit theorems for independent random variables. Characteristic function methods. Conditional expectations, martingales and martingale convergence theorems. Markov chains. Stationary processes. Brownian motion.
Probability Theory: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Also listed as: MATH C218B

Probability Theory: Read Less [-]
STAT 210A Theoretical Statistics 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
An introduction to mathematical statistics, covering both frequentist and Bayesian aspects of modeling, inference, and decision-making. Topics include statistical decision theory; point estimation; minimax and admissibility; Bayesian methods; exponential families; hypothesis testing; confidence intervals; small and large sample theory; and M-estimation.

Rules & Requirements
Prerequisites: Linear algebra, real analysis, and a year of upper division probability and statistics

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

STAT 210B Theoretical Statistics 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Introduction to modern theory of statistics; empirical processes, influence functions, M-estimation, U and V statistics and associated stochastic decompositions; non-parametric function estimation and associated minimax theory; semiparametric models; Monte Carlo methods and bootstrap methods; distributionfree and equivariant procedures; topics in machine learning. Topics covered may vary with instructor.

Rules & Requirements
Prerequisites: Statistics 210A and a graduate level probability course; a good understanding of various notions of stochastic convergence

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

STAT 212A Topics in Theoretical Statistics 3 Units
Terms offered: Fall 2015, Fall 2012, Fall 2011
This course introduces the student to topics of current research interest in theoretical statistics. Recent topics include information theory, multivariate analysis and random matrix theory, high-dimensional inference. Typical topics have been model selection; empirical and point processes; the bootstrap, stochastic search, and Monte Carlo integration; information theory and statistics; semi- and non-parametric modeling; time series and survival analysis.

Rules & Requirements
Prerequisites: 210 or 205 and 215
Repeat rules: Course may be repeated for credit with different instructor. Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

STAT 212B Topics in Theoretical Statistics 3 Units
Terms offered: Spring 2016
This course introduces the student to topics of current research interest in theoretical statistics. Recent topics include information theory, multivariate analysis and random matrix theory, high-dimensional inference. Typical topics have been model selection; empirical and point processes; the bootstrap, stochastic search, and Monte Carlo integration; information theory and statistics; semi- and non-parametric modeling; time series and survival analysis.

Rules & Requirements
Prerequisites: 210 or 205 and 215
Repeat rules: Course may be repeated for credit with different instructor. Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

Formerly known as: 216A-216B and 217A-217B
Topics in Theoretical Statistics: Read Less [-]
STAT 215A Statistical Models: Theory and Application 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Applied statistics with a focus on critical thinking, reasoning skills, and techniques. Hands-on-experience with solving real data problems with high-level programming languages such as R. Emphasis on examining the assumptions behind standard statistical models and methods. Exploratory data analysis (e.g., graphical data summaries, PCAs, clustering analysis). Model formulation, fitting, and validation and testing. Linear regression and generalizations (e.g., GLMs, ridge regression, lasso).

Statistical Models: Theory and Application: Read More [+]

Rules & Requirements

Prerequisites: Linear algebra, calculus, upper division probability and statistics, and familiarity with high-level programming languages. Statistics 133, 134, and 136 recommended

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Graduate

Grading: Letter grade.

Statistical Models: Theory and Application: Read Less [-]

STAT 215B Statistical Models: Theory and Application 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Course builds on 215A in developing critical thinking skills and the techniques of advanced applied statistics. Particular topics vary with instructor. Examples of possible topics include planning and design of experiments, ANOVA and random effects models, splines, classification, spatial statistics, categorical data analysis, survival analysis, and multivariate analysis.

Statistical Models: Theory and Application: Read More [+]

Rules & Requirements

Prerequisites: Statistics 215A or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Graduate

Grading: Letter grade.

Statistical Models: Theory and Application: Read Less [-]

STAT 222 Masters of Statistics Capstone Project 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
The capstone project is part of the masters degree program in statistics. Students engage in professionally-oriented group research under the supervision of a research advisor. The research synthesizes the statistical, computational, economic, and social issues involved in solving complex real-world problems.

Masters of Statistics Capstone Project: Read More [+]

Rules & Requirements

Prerequisites: Statistics 201A-201B, 243. Restricted to students who have been admitted to the one-year Masters Program in Statistics beginning fall 2012 or later

Hours & Format
Fall and/or spring: 15 weeks - 4 hours of seminar per week

Additional Details

Subject/Course Level: Statistics/Graduate

Grading: Letter grade.

Masters of Statistics Capstone Project: Read Less [-]

STAT 230A Linear Models 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Theory of least squares estimation, interval estimation, and tests under the general linear fixed effects model with normally distributed errors. Large sample theory for non-normal linear models. Two and higher way layouts, residual analysis. Effects of departures from the underlying assumptions. Robust alternatives to least squares.

Linear Models: Read More [+]

Rules & Requirements

Prerequisites: Matrix algebra, a year of calculus, two semesters of upper division or graduate probability and statistics

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Statistics/Graduate

Grading: Letter grade.

Linear Models: Read Less [-]
STAT 232 Experimental Design 4 Units
Terms offered: Spring 2013, Fall 2009, Spring 2008
Randomization, blocking, factorial design, confounding, fractional replication, response surface methodology, optimal design. Applications.
Experimental Design: Read More [+]
Rules & Requirements
Prerequisites: 200B or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Experimental Design: Read Less [-]

STAT 238 Bayesian Statistics 3 Units
Terms offered: Fall 2016
Bayesian methods and concepts: conditional probability, one-parameter and multiparameter models, prior distributions, hierarchical and multi-level models, predictive checking and sensitivity analysis, model selection, linear and generalized linear models, multiple testing and high-dimensional data, mixtures, non-parametric methods. Case studies of applied modeling. In-depth computational implementation using Markov chain Monte Carlo and other techniques. Basic theory for Bayesian methods and decision theory. The selection of topics may vary from year to year.
Bayesian Statistics: Read More [+]
Objectives Outcomes
Course Objectives: develop Bayesian models for new types of data implement Bayesian models and interpret the results read and discuss Bayesian methods in the literature select and build appropriate Bayesian models for data to answer research questions understand and describe the Bayesian perspective and its advantages and disadvantages compared to classical methods
Rules & Requirements
Prerequisites: Probability and mathematical statistics at the level of Stat 134 and Stat 135 or, ideally, Stat 201A and Stat 201B

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of laboratory per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Bayesian Statistics: Read Less [-]

STAT 239A The Statistics of Causal Inference in the Social Science 4 Units
Terms offered: Fall 2015, Fall 2014
Approaches to causal inference using the potential outcomes framework. Covers observational studies with and without ignorable treatment assignment, randomized experiments with and without noncompliance, instrumental variables, regression discontinuity, sensitivity analysis and randomization inference. Applications are drawn from a variety of fields including political science, economics, sociology, public health and medicine.
The Statistics of Causal Inference in the Social Science: Read More [+]
Rules & Requirements
Prerequisites: At least one graduate matrix based multivariate regression course in addition to introductory statistics and probability

Hours & Format
Fall and/or spring: 15 weeks - 3-3 hours of lecture and 1-2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.
Instructor: Sekhon
The Statistics of Causal Inference in the Social Science: Read Less [-]

STAT 239B Quantitative Methodology in the Social Sciences Seminar 4 Units
Terms offered: Spring 2016, Spring 2015
A seminar on successful research designs and a forum for students to discuss the research methods needed in their own work, supplemented by lectures on relevant statistical and computational topics such as matching methods, instrumental variables, regression discontinuity, and Bayesian, maximum likelihood and robust estimation. Applications are drawn from political science, economics, sociology, and public health. Experience with R is assumed.
Quantitative Methodology in the Social Sciences Seminar: Read More [+]
Rules & Requirements
Prerequisites: Statistics 239A or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3-3 hours of lecture and 1-2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.
Quantitative Methodology in the Social Sciences Seminar: Read Less [-]
STAT C239A The Statistics of Causal Inference in the Social Science 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2013
Approaches to causal inference using the potential outcomes framework. Covers observational studies with and without ignorable treatment assignment, randomized experiments with and without noncompliance, instrumental variables, regression discontinuity, sensitivity analysis and randomization inference. Applications are drawn from a variety of fields including political science, economics, sociology, public health and medicine.

The Statistics of Causal Inference in the Social Science: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Also listed as: POL SCI C236A

The Statistics of Causal Inference in the Social Science: Read Less [-]

STAT C239B Quantitative Methodology in the Social Sciences Seminar 4 Units
Terms offered: Fall 2017, Spring 2017
A seminar on successful research designs and a forum for students to discuss the research methods needed in their own work, supplemented by lectures on relevant statistical and computational topics such as matching methods, instrumental variables, regression discontinuity, and Bayesian, maximum likelihood and robust estimation. Applications are drawn from political science, economics, sociology, and public health. Experience with R is assumed.
Quantitative Methodology in the Social Sciences Seminar: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Also listed as: POL SCI C236B

Quantitative Methodology in the Social Sciences Seminar: Read Less [-]

STAT 240 Nonparametric and Robust Methods 4 Units
Terms offered: Fall 2017, Fall 2016, Spring 2015
Standard nonparametric tests and confidence intervals for continuous and categorical data; nonparametric estimation of quantiles; robust estimation of location and scale parameters. Efficiency comparison with the classical procedures.

Nonparametric and Robust Methods: Read More [+]

Rules & Requirements
Prerequisites: A year of upper division probability and statistics

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

Nonparametric and Robust Methods: Read Less [-]

STAT C241A Statistical Learning Theory 3 Units
Terms offered: Fall 2016, Fall 2015, Fall 2014
Classification regression, clustering, dimensionality, reduction, and density estimation. Mixture models, hierarchical models, factorial models, hidden Markov, and state space models, Markov properties, and recursive algorithms for general probabilistic inference nonparametric methods including decision trees, kernal methods, neural networks, and wavelets. Ensemble methods.
Statistical Learning Theory: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructors: Bartlett, Jordan, Wainwright
Also listed as: COMPSCI C281A

Statistical Learning Theory: Read Less [-]
STAT C241B Advanced Topics in Learning and Decision Making 3 Units
Terms offered: Spring 2017, Spring 2016, Spring 2014
Advanced Topics in Learning and Decision Making: Read More [+] Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructors: Bartlett, Jordan, Wainwright
Also listed as: COMPSCI C281B
Advanced Topics in Learning and Decision Making: Read Less [-]

STAT 243 Introduction to Statistical Computing 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Concepts in statistical programming and statistical computation, including programming principles, data and text manipulation, parallel processing, simulation, numerical linear algebra, and optimization.
Introduction to Statistical Computing: Read More [+] Objectives Outcomes
Student Learning Outcomes: Become familiar with concepts and tools for reproducible research and good scientific computing practices. Operate effectively in a UNIX environment and on remote servers. Program effectively in languages including R and Python with an advanced knowledge of language functionality and an understanding of general programming concepts. Understand in depth and make use of principles of numerical linear algebra, optimization, and simulation for statistics-related research.
Rules & Requirements
Prerequisites: Knowledge of a higher level programming language

STAT 244 Statistical Computing 4 Units
Terms offered: Spring 2011, Spring 2010, Spring 2009
Algorithms in statistical computing: random number generation, generating other distributions, random sampling and permutations. Matrix computations in linear models. Non-linear optimization with applications to statistical procedures. Other topics of current interest, such as issues of efficiency, and use of graphics.
Statistical Computing: Read More [+] Rules & Requirements
Prerequisites: Knowledge of a higher level programming language

STAT C245A Introduction to Modern Biostatistical Theory and Practice 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Course covers major topics in general statistical theory, with a focus on statistical methods in epidemiology. The course provides a broad theoretical framework for understanding the properties of commonly-used and more advanced methods. Emphasis is on estimation in nonparametric models in the context of contingency tables, regression (e.g., linear, logistic), density estimation and more. Topics include maximum likelihood and loss-based estimation, asymptotic linearity/normality, the delta method, bootstrapping, machine learning, targeted maximum likelihood estimation. Comprehension of broad concepts is the main goal, but practical implementation in R is also emphasized. Basic knowledge of probability/statistics and calculus are assumed.
Introduction to Modern Biostatistical Theory and Practice: Read More [+] Rules & Requirements
Prerequisites: Statistics 200A (may be taken concurrently)

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: Hubbard
Also listed as: PB HLTH C240A
Introduction to Modern Biostatistical Theory and Practice: Read Less [-]
STAT C245B Biostatistical Methods: Survival Analysis and Causality 4 Units
Terms offered: Fall 2017, Fall 2015, Fall 2013, Spring 2012
Analysis of survival time data using parametric and non-parametric models, hypothesis testing, and methods for analyzing censored (partially observed) data with covariates. Topics include marginal estimation of a survival function, estimation of a generalized multivariate linear regression model (allowing missing covariates and/or outcomes), estimation of a multiplicative intensity model (such as Cox proportional hazards model) and estimation of causal parameters assuming marginal structural models. General theory for developing locally efficient estimators of the parameters of interest in censored data models. Computing techniques, numerical methods, simulation and general implementation of biostatistical analysis techniques with emphasis on data applications.
Biostatistical Methods: Survival Analysis and Causality: Read More [+]
Rules & Requirements
Prerequisites: Statistics 200B (may be taken concurrently)
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: van der Laan
Also listed as: PB HLTH C240B
Biostatistical Methods: Survival Analysis and Causality: Read Less [-]

STAT C245C Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine 4 Units
Terms offered: Fall 2016, Fall 2015, Fall 2014, Fall 2012
This course provides an introduction to computational statistics, with emphasis on statistical methods and software for addressing high-dimensional inference problems in biology and medicine. Topics include numerical and graphical data summaries, loss-based estimation (regression, classification, density estimation), smoothing, EM algorithm, Markov chain Monte-Carlo, clustering, multiple testing, resampling, hidden Markov models, in silico experiments.
Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine: Read More [+]
Rules & Requirements
Prerequisites: Statistics 200A or equivalent (may be taken concurrently)
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: Dudoit
Also listed as: PB HLTH C240C
Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine: Read Less [-]
STAT C245D Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine II 4 Units
Terms offered: Fall 2017, Fall 2015, Fall 2013, Spring 2009
This course and Pb Hlth C240C/Stat C245C provide an introduction to computational statistics with emphasis on statistical methods and software for addressing high-dimensional inference problems that arise in current biological and medical research. The courses also discuss statistical computing resources, with emphasis on the R language and environment (www.r-project.org). Programming topics to be discussed include: data structures, functions, statistical models, graphical procedures, designing an R package, object-oriented programming, inter-system interfaces. The statistical and computational methods are motivated by and illustrated on data structures that arise in current high-dimensional inference problems in biology and medicine.
Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine II: Read More [+]
Rules & Requirements
Prerequisites: Statistics 200A-200B or Statistics 201A-201B (may be taken concurrently) or consent of instructor
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: Dudoit
Also listed as: PB HLTH C240D
Biostatistical Methods: Computational Statistics with Applications in Biology and Medicine II: Read Less [-]

STAT C245E Statistical Genomics 4 Units
Terms offered: Spring 2013, Fall 2012, Fall 2010, Fall 2009
Genomics is one of the fundamental areas of research in the biological sciences and is rapidly becoming one of the most important application areas in statistics. This is the first course of a two-semester sequence, which provides an introduction to statistical and computational methods for the analysis of meiosis, population genetics, and genetic mapping. The second course is Statistics C245F/Public Health C240F. The courses are primarily intended for graduate students and advanced undergraduate students from the mathematical sciences.
Statistical Genomics: Read More [+]
Rules & Requirements
Prerequisites: Statistics 200A and 200B or equivalent (may be taken concurrently). A course in algorithms and knowledge of at least one computing language (e.g., R, matlab) is recommended
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructors: Dudoit, Huang, Nielsen, Song
Also listed as: PB HLTH C240E
Statistical Genomics: Read Less [-]

STAT C245F Statistical Genomics 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015, Spring 2014
Genomics is one of the fundamental areas of research in the biological sciences and is rapidly becoming one of the most important application areas in statistics. The first course in this two-semester sequence is Public Health C240E/Statistics C245E. This is the second course, which focuses on sequence analysis, phylogenetics, and high-throughput microarray and sequencing gene expression experiments. The courses are primarily intended for graduate students and advanced undergraduate students from the mathematical sciences.
Statistical Genomics: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructors: Dudoit, Huang, Nielsen, Song
Also listed as: PB HLTH C240F
Statistical Genomics: Read Less [-]
STAT C247C Longitudinal Data Analysis 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
The course covers the statistical issues surrounding estimation of effects using data on subjects followed through time. The course emphasizes a regression model approach and discusses disease incidence modeling and both continuous outcome data/linear models and longitudinal extensions to nonlinear models (e.g., logistic and Poisson). The primary focus is from the analysis side, but mathematical intuition behind the procedures will also be discussed. The statistical/mathematical material includes some survival analysis, linear models, logistic and Poisson regression, and matrix algebra for statistics. The course will conclude with an introduction to recently developed causal regression techniques (e.g., marginal structural models). Time permitting, serially correlated data on ecological units will also be discussed.

Rules & Requirements
Prerequisites: 142, 145, 241 or equivalent courses in basic statistics, linear and logistic regression

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructors: Hubbard, Jewell
Also listed as: PB HLTH C242C

Longitudinal Data Analysis: Read Less [-]

STAT 248 Analysis of Time Series 4 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Frequency-based techniques of time series analysis, spectral theory, linear filters, estimation of spectra, estimation of transfer functions, design, system identification, vector-valued stationary processes, model building.

Analysis of Time Series: Read More [+]

Rules & Requirements
Prerequisites: 102 or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: van der Laan
Also listed as: PB HLTH C246A

Analysis of Time Series: Read Less [-]

STAT C249A Censored Longitudinal Data and Causality 4 Units
Terms offered: Spring 2014, Spring 2013, Fall 2011, Spring 2011
This course examines optimal robust methods for statistical inference regarding causal and non-causal parameters based on longitudinal data in the presence of informative censoring and informative confounding of treatment. Models presented include multivariate regression models, multiplicative intensity models for counting processes, and causal models such as marginal structural models and structural nested models. Methods will be illustrated with data sets of practical interest and analyzed in the laboratory section. This course, appropriate for advanced masters and Ph.D. students, provides exposure to a number of ongoing research topics.

Rules & Requirements
Prerequisites: 240B, Statistics 200A-200B or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Instructor: van der Laan

Censored Longitudinal Data and Causality: Read Less [-]
STAT 259 Reproducible and Collaborative Statistical Data Science 4 Units
Terms offered: Fall 2017, Spring 2016, Fall 2015
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.
Reproducible and Collaborative Statistical Data Science: Read More [+]

Rules & Requirements
Prerequisites: Statistics 133, Statistics 134, and Statistics 135 (or equivalent)
Credit Restrictions: Students will receive no credit for Statistics 259 after taking Statistics 159.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

Reproducible and Collaborative Statistical Data Science: Read Less [-]

STAT 260 Topics in Probability and Statistics 3 Units
Terms offered: Spring 2017, Spring 2016, Spring 2015
Special topics in probability and statistics offered according to student demand and faculty availability.
Topics in Probability and Statistics: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

Topics in Probability and Statistics: Read Less [-]

STAT 261 Quantitative/Statistical Research Methods in Social Sciences 3 Units
Terms offered: Spring 2016, Spring 2015, Spring 2014
Selected topics in quantitative/statistical methods of research in the social sciences and particularly in sociology. Possible topics include: analysis of qualitative/categorical data; loglinear models and latent-structure analysis; the analysis of cross-classified data having ordered and unordered categories; measure, models, and graphical displays in the analysis of cross-classified data; correspondence analysis, association analysis, and related methods of data analysis.
Quantitative/Statistical Research Methods in Social Sciences: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.

Also listed as: SOCIOL C271D
Quantitative/Statistical Research Methods in Social Sciences: Read Less [-]

STAT 272 Statistical Consulting 3 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
To be taken concurrently with service as a consultant in the department's drop-in consulting service. Participants will work on problems arising in the service and will discuss general ways of handling such problems. There will be working sessions with researchers in substantive fields and occasional lectures on consulting.
Statistical Consulting: Read More [+]

Rules & Requirements
Prerequisites: Some course work in applied statistics and permission of instructor
Repeat rules: Course may be repeated for credit.

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of session per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Statistical Consulting: Read Less [-]
STAT 278B Statistics Research Seminar 1 - 4 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Special topics, by means of lectures and informational conferences.
Statistics Research Seminar: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 0 hours of seminar per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Statistics Research Seminar: Read Less [-]

STAT 298 Directed Study for Graduate Students 1 - 12 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Special tutorial or seminar on selected topics.
Directed Study for Graduate Students: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Summer:
6 weeks - 1-16 hours of independent study per week
8 weeks - 1-12 hours of independent study per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Directed Study for Graduate Students: Read Less [-]

STAT 299 Individual Study Leading to Higher Degrees 1 - 12 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Individual study
Individual Study Leading to Higher Degrees: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 3-36 hours of independent study per week
Summer:
6 weeks - 7.5-45 hours of independent study per week
8 weeks - 6-36 hours of independent study per week
10 weeks - 4.5-27 hours of independent study per week
Additional Details
Subject/Course Level: Statistics/Graduate
Grading: Letter grade.
Individual Study Leading to Higher Degrees: Read Less [-]

STAT 375 Professional Preparation: Teaching of Probability and Statistics 2 - 4 Units
Terms offered: Fall 2017, Fall 2016, Fall 2015
Discussion, problem review and development, guidance of laboratory classes, course development, supervised practice teaching.
Professional Preparation: Teaching of Probability and Statistics: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing and appointment as a graduate student instructor
Repeat rules: Course may be repeated for credit.
Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture and 4 hours of laboratory per week
Additional Details
Subject/Course Level: Statistics/Professional course for teachers or prospective teachers
Grading: Offered for satisfactory/unsatisfactory grade only.
Formerly known as: Statistics 300
Professional Preparation: Teaching of Probability and Statistics: Read Less [-]
STAT 601 Individual Study for Master’s Candidates 1 - 8 Units
Terms offered: Summer 2017 8 Week Session, Spring 2017, Spring 2016
Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for the master's comprehensive examinations. Units may not be used to meet either unit or residence requirements for a master's degree.

Individual Study for Master's Candidates: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for a maximum of 16 units. Course may be repeated for a maximum of 16 units.

Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Summer:
6 weeks - 1-10 hours of independent study per week
8 weeks - 1-8 hours of independent study per week

Additional Details
Subject/Course Level: Statistics/Graduate examination preparation
Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Master's Candidates: Read Less [-]

STAT 602 Individual Study for Doctoral Candidates 1 - 8 Units
Terms offered: Fall 2017, Spring 2017, Fall 2016
Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for the Ph.D. degree.

Individual Study for Doctoral Candidates: Read More [+]
Rules & Requirements
Prerequisites: One year of full-time graduate study and permission of the graduate adviser
Credit Restrictions: Course does not satisfy unit or residence requirements for doctoral degree.
Repeat rules: Course may be repeated for a maximum of 16 units. Course may be repeated for a maximum of 16 units.

Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Summer:
6 weeks - 1-10 hours of independent study per week
8 weeks - 1-8 hours of independent study per week

Additional Details
Subject/Course Level: Statistics/Graduate examination preparation
Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Candidates: Read Less [-]

STAT 700 Statistics Colloquium 0.0 Units
Terms offered: Prior to 2007
The Statistics Colloquium is a forum for talks on the theory and applications of Statistics to be given to the faculty and graduate students of the Statistics Department and other interested parties.
Statistics Colloquium: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 1-2 hours of colloquium per week

Additional Details
Subject/Course Level: Statistics/Graduate examination preparation
Grading: The grading option will be decided by the instructor when the class is offered.

Statistics Colloquium: Read Less [-]