

# STATISTICS (STAT)

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## **STAT 1000Q. Introduction to Statistics I. (4 Credits)**

A standard approach to statistical analysis primarily for students of business and economics; elementary probability, sampling distributions, normal theory estimation and hypothesis testing, regression and correlation, exploratory data analysis. Learning to do statistical analysis on a personal computer is an integral part of the course.

Students can receive no more than four credits from STAT 1000Q and 1100Q. Students who have passed a 2000-level or above STAT course or who are taking such a course concurrently cannot take 1000-level STAT courses.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%201000Q>)

## **STAT 1100Q. Elementary Concepts of Statistics. (4 Credits)**

Standard and nonparametric approaches to statistical analysis; exploratory data analysis, elementary probability, sampling distributions, estimation and hypothesis testing, one- and two-sample procedures, regression and correlation. Learning to do statistical analysis on a personal computer is an integral part of the course.

Students can receive no more than four credits from STAT 1000Q and 1100Q. Students who have passed a 2000-level or above STAT course or who are taking such a course concurrently cannot take 1000-level STAT courses.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%201100Q>)

## **STAT 2215Q. Introduction to Statistics II. (3 Credits)**

Analysis of variance, multiple regression, chi-square tests, and non-parametric procedures.

STAT 1000Q or 1100Q.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%202215Q>)

## **STAT 2255. Statistical Programming. (3 Credits)**

Introduction to statistical programming via Python including data types, control flow, object-oriented programming, and graphical user interface-driven applications such as Jupyter notebooks. Emphasis on algorithmic thinking, efficient implementation of different data structures, control and data abstraction, file processing, and data analysis and visualization.

MATH 1132Q, or instructor consent. Recommended preparation: CSE 1010 or prior programming experience. Not open to students who have passed CSE 2050 or 2500 or ECON 3322 or 5322.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%202255>)

## **STAT 3005. Biostatistics for Health Professions. (3 Credits)**

(Also offered as AH 3005.) Introduction to biostatistical techniques, concepts, and reasoning using in a broad range of biomedical and public health related scenarios. Specific topics include description of data, statistical hypothesis testing and its application to group comparisons, and tools for modeling different type of data, including categorical, and time-event, data. Emphasis on the distinction of these methods, their implementation using statistical software, and the interpretation of results applied to health sciences research questions and variables.

A course in pre-calculus or higher; STAT 1000Q or 1100Q or higher. Open to CAHNR students and Statistics majors, juniors or higher; others with instructor consent. Not open to students who have passed PUBH 5409.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203005>)

## **STAT 3025Q. Statistical Methods. (3 Credits)**

Basic probability distributions, point and interval estimation, tests of hypotheses, correlation and regression, analysis of variance, experimental design, non-parametric procedures.

MATH 1132Q or 1152Q; students may not receive more than three credits from STAT 3025 and 3345. May not be taken out of sequence after passing STAT 3445, 4190, or 4625.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203025Q>)

## **STAT 3115Q. Analysis of Experiments. (3 Credits)**

Straight-line regression, multiple regression, regression diagnostics, transformations, dummy variables, one-way and two-way analysis of variance, analysis of covariance, stepwise regression.

STAT 2215Q or 3025Q or instructor consent. Not open for credit to students who have passed STAT 3215Q or 5315.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203115Q>)

## **STAT 3215Q. Applied Linear Regression in Data Science. (3 Credits)**

Applied multiple linear regression analysis in data science, with an emphasis on modern statistical regression methods: simple linear regression and correlation analysis, multiple linear regression, analysis of variance, goodness of fit, comparing regression models through partial and sequential F tests, dummy variables, regression assumptions and diagnostics, model selection and penalized regression, prediction and model validation, principles of design of experiments, one-way and two-way analysis of variance.

STAT 2215Q or 3025Q or instructor consent. Not open for credit to students who have passed STAT 3115Q or 5315.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203215Q>)

## **STAT 3255. Introduction to Data Science. (3 Credits)**

Introduction to data science for effectively storing, processing, analyzing and making inferences from data. Topics include project management, data preparation, data visualization, statistical models, machine learning, distributed computing, and ethics.

MATH 1132Q, STAT 2255 or COGS 2500Q or ECON 3322, STAT 3115Q or 3215Q, or instructor consent

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203255>)

**STAT 3345Q. Probability Models for Engineers. (3 Credits)**

Probability set functions, random variables, expectations, moment generating functions, discrete and continuous random variables, joint and conditional distributions, multinomial distribution, bivariate normal distribution, functions of random variables, central limit theorems, computer simulation of probability models.

MATH 2110Q or 2130Q. Students may not receive more than three credits from STAT 3025Q and 3345Q, or from STAT 3345Q and 3375Q.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203345Q>)

**STAT 3375Q. Introduction to Mathematical Statistics I. (3 Credits)**

The mathematical theory underlying statistical methods. Probability spaces, distributions in one and several dimensions, generating functions, and limit theorems.

A grade of C+ or better in MATH 2110Q or 2130Q. Not open for credit to students who have passed STAT 3345Q or 5585. May not be taken out of sequence after passing STAT 3445Q.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203375Q>)

**STAT 3445. Introduction to Mathematical Statistics II. (3 Credits)**

Sampling distributions and parameter estimation. Neyman-Pearson theory of hypothesis testing, correlation, regression, analysis of variance. STAT 3375Q. Not open for credit to students who have passed STAT 5685. May not be taken out of sequence after passing STAT 4875.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203445>)

**STAT 3494W. Undergraduate Seminar. (1 Credit)**

The student will attend 6-8 seminars per semester, and choose one statistical topic to investigate in detail. The student will write a well-revised, comprehensive paper on this topic, including a literature review, description of technical details, and a summary and discussion.

STAT 2215Q or 3115Q; STAT 3025Q or 3375Q; ENGL 1007 or 1010 or 1011 or 2011.

**Skill Codes:** COMP. Writing Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203494W>)

**STAT 3515Q. Design of Experiments. (3 Credits)**

Methods of designing experiments utilizing regression analysis and the analysis of variance.

STAT 2215Q or 3025Q or instructor consent. Credits may not be received for both STAT 3515Q and BIST/STAT 5515.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203515Q>)

**STAT 3675Q. Statistical Computing. (4 Credits)**

Introduction to computing for statistical problems; obtaining features of distributions, fitting models and implementing inference (obtaining confidence intervals and running hypothesis tests); simulation-based approaches and basic numerical methods. One hour per week devoted to computing and programming skills.

STAT 3025Q or 3375Q. Recommended preparation: an applied statistics course.

**Skill Codes:** COMP. Quantitative Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203675Q>)

**STAT 3965. Elementary Stochastic Processes. (3 Credits)**

(Also offered as MATH 3170.) Conditional distributions, discrete and continuous time Markov chains, limit theorems for Markov chains, random walks, Poisson processes, compound and marked Poisson processes, and Brownian motion. Selected applications from actuarial science, biology, engineering, or finance.

STAT 3345Q or 3375Q or MATH 3160.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%203965>)

**STAT 4185. Special Topics. (1-6 Credits)**

Prerequisites and recommended preparation vary.

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204185>)

**STAT 4188. Variable Topics. (1-6 Credits)**

Prerequisites and recommended preparation vary.

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204188>)

**STAT 4190. Field Study Internship. (1-3 Credits)**

Supervised field work relevant to some area of Statistics or Data Science with a regional industry, government agency, or non-profit organization. Evaluated by the field supervisor and by the instructor (based on a detailed written report submitted by the student). Students taking this course will be assigned a final grade of S (satisfactory) or U (unsatisfactory).

Completion with a grade of 'C' or better in STAT 3025Q or 3375Q, and STAT 3115Q or 3215Q or 3515Q. Completion of first year-sophomore general CLAS requirements.

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204190>)

**STAT 4255. Introduction to Statistical Learning. (3 Credits)**

Modern statistical learning methods arising frequently in data science and machine learning with real-world applications: linear and logistic regression, generalized additive models, decision trees, boosting, support vector machines, and neural networks (deep learning).

STAT 3115Q or 3215Q or instructor consent. Recommended preparation:

Background in computer programming is preferred, but not required.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204255>)

**STAT 4299. Independent Study. (1-6 Credits)**

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204299>)

**STAT 4389. Undergraduate Research. (3 Credits)**

Supervised research in probability or statistics. A final written report and oral presentation are required.

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204389>)

**STAT 4525. Sampling Theory. (3 Credits)**

Sampling and nonsampling error, bias, sampling design, simple random sampling, sampling with unequal probabilities, stratified sampling, optimum allocation, proportional allocation, ratio estimators, regression estimators, super population approaches, inferences in finite populations. STAT 3445.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204525>)

**STAT 4625. Introduction to Biostatistics. (3 Credits)**

Rates and proportions, sensitivity, specificity, two-way tables, odds ratios, relative risk, ordered and non-ordered classifications, trends, case-control studies, elements of regression including logistic and Poisson, additivity and interaction, combination of studies and meta-analysis.  
STAT 3025Q.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204625>)

**STAT 4825. Applied Time Series. (3 Credits)**

Introduction to prediction using time-series regression methods with non-seasonal and seasonal data. Smoothing methods for forecasting. Modeling and forecasting using univariate, autoregressive, moving average models.

STAT 3445.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204825>)

**STAT 4845. Applied Spatio-Temporal Statistics. (3 Credits)**

Applied statistical methodology and computing for spatio-temporal data, including visualization, models, and inferences. Extreme value analysis in spatio-temporal contexts. Focus on models that account for spatio-temporal dependence and inferences that provide appropriate uncertainty measures, with applications to real-world problems using open-source software.

STAT 3445; STAT 3215Q or 3675Q or instructor consent. Recommended preparation: Experience with R.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204845>)

**STAT 4875. Nonparametric Methods. (3 Credits)**

Basic ideas, the empirical distribution function and its applications, uses of order statistics, one- two- and c-sample problems, rank correlation, efficiency.

STAT 3445.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204875>)

**STAT 4915. Data Science in Action. (3 Credits)**

Capstone course in data science. Real-world statistical data science in practice: problem formulation; integration of statistics, computing, and domain knowledge; collaboration; communication; reproducibility; project management.

STAT 3255; STAT 3025Q or 3375Q or MATH 3160 or instructor consent.

Corequisite: STAT 4916W. Open only to Statistical Data Science majors.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204915>)

**STAT 4916W. Writing in Data Science. (1 Credit)**

The course is a companion course to STAT 4915, which must be taken concurrently. Students will write a well-revised and comprehensive paper on their STAT 4915 course project, including literature review, description of technical details, reproducible statistical and data scientific analyses, and discussion of results.

STAT 3255; STAT 3025Q or 3375Q or MATH 3160 or instructor consent;

ENGL 1007 or 1010 or 1011 or 2011. Corequisite: STAT 4915 must be

taken concurrently with STAT 4916W or instructor consent.

**Skill Codes:** COMP. Writing Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=STAT%204916W>)