

# STATISTICS (STAT)

## STAT 1100 - Introduction to Statistics

3 Credits

Basic descriptive and inferential statistics. Emphasis on becoming a smart consumer of statistics. Will include the study of examples of statistics in the medical news. Credit not given for MATH 1300 or MATH 1260 or OPM 2070 and STAT 1100, STAT 1300, STAT 1260.

**Prerequisite(s):** (MATH 0260 with a grade of C- or higher, SLU Math Index with a minimum score of 750, MATH 1200, MATH 1400, MATH 1320, MATH 1510, MATH 0265 with a grade of C- or higher, SLU Math Placement with a minimum score of 1200, MATH 1000 with a grade of C- or higher, or SLU Stats Placement with a minimum score of 1100)

### Restrictions:

Students in the Chaifetz School of Business college may **not** enroll.

**Attributes:** UUC:Quantitative Reasoning

## STAT 1260 - Statistics Including Sports and Politics

3 Credits

A SLU inquiry seminar. Producing data through the use of samples and experiments; organizing data through graphs and numbers that describe the distribution of the data of one variable or the relationship between two variables; probability; statistical inference including confidence intervals and tests of significance. Cross-listed with MATH 1260.

**Prerequisite(s):** (MATH 1200 with a grade of C- or higher or Math Waiver per Advisor with a minimum score of 1200)

## STAT 1300 - Elementary Statistics with Computers

3 Credits

Data production and analysis; probability basics, distributions; sampling, estimation with confidence intervals, hypothesis testing, t-test; correlation and regression; cross-tabulations and chi-square. Students learn to use the statistical package R.

**Prerequisite(s):** (MATH 1200, SLU Math Placement with a minimum score of 1400, Math Waiver per Advisor with a minimum score of 1200, MATH 1400, MATH 1510, or MATH 1520)

**Attributes:** Applied Data Science in SS, Bio-Chemical Biology Elective, Mathematics BA Req (A&S), UUC:Quantitative Reasoning

## STAT 1930 - Special Topics

1-3 Credits

## STAT 2300 - Intermediate Statistics

3 Credits

A statistically sophisticated, data driven course covering one and two sample comparisons of means, simple linear regression, multiple regression and two-way analysis of variance. Data wrangling and visualization. Assumptions of methods, robustness to deviations from assumptions and communicating results of statistical tests in professional ways will be taught throughout the course.

**Prerequisite(s):** STAT 1300

**Attributes:** UUC:Quantitative Reasoning

## STAT 3850 - Foundation of Statistics

3 Credits

Descriptive statistics, probability distributions, random variables, expectation, independence, hypothesis testing, confidence intervals, regression and ANOVA. Applications and theory. Taught using statistical software. Credit not given toward the math major or minors for both MATH 3810 and MATH 3850 / STAT 3850.

**Prerequisite(s):** (MATH 1520 or SLU Math Placement with a minimum score of 2530)

**Attributes:** Bio-Chemical Biology Elective, Chemical Biology Elective

## STAT 3910 - Internship

1-6 Credits (Repeatable for credit)

**Prerequisite(s):** CORE 1500\*; CORE 1000

\* Concurrent enrollment allowed.

**Attributes:** UUC:Reflection-in-Action

## STAT 3930 - Special Topics

3 Credits (Repeatable for credit)

## STAT 3980 - Independent Study

1 or 3 Credits (Repeatable for credit)

## STAT 4800 - Probability Theory

3 Credits

Axioms of probability, conditional probability. Discrete and continuous random variables, expectation, jointly defined random variables.

Transformations of random variables and limit theorems. Theory and applications, taught using statistical software. Credit not given toward the math major or minor for any two of MATH 3800, MATH 4800, and STAT 4800. Cross-listed with MATH 4800.

**Prerequisite(s):** (MATH 3850 or STAT 3850); MATH 2530; (MATH 1660 or MATH 2660)

**Attributes:** Geospatial Elective

## STAT 4840 - Time Series

3 Credits

Applied time series. Topics include exploratory data analysis, regression, ARIMA. Spectral analysis, state-space models. Theory and applications, taught using statistical software. Cross-listed with MATH 4840.

**Prerequisite(s):** (STAT 3850 or MATH 3850)

**Attributes:** Geospatial Elective

## STAT 4850 - Mathematical Statistics

3 Credits

Theory of estimators, sampling distributions, hypothesis testing, confidence intervals, regression, bootstrapping, and resampling. Theory and applications, taught using statistical software.

**Prerequisite(s):** (MATH 4800 or STAT 4800)

**Attributes:** Geospatial Elective

## STAT 4860 - Statistical Models

3 Credits

STAT 4860 is a course in random processes and their applications.

This course will deal with the theory of discrete and continuous time Markov Chains, Brownian motion, stationary processes, and stochastic simulation methods (Markov Chain Monte Carlo). We will make use of R to simulate examples of stochastic processes.

**Prerequisite(s):** (MATH 4800 or STAT 4800)

## STAT 4870 - Applied Regression

3 Credits

Linear regression, model selection, nonparametric regression, classification and graphical models. Theory and applications using statistical software. Cross-listed with MATH 4870.

**Prerequisite(s):** (MATH 3850 or STAT 3850); (MATH 3110 or MATH 3120)

**Attributes:** Geospatial Elective

## STAT 4880 - Bayesian Statistics and Statistical Computing

3 Credits

This course introduces Bayesian statistical methods and statistical computing techniques using statistical computing software. Topics include Bayesian models, Markov chain Monte Carlo, hierarchical modeling, model comparison and regression models.

**Prerequisite(s):** MATH 3850

**Attributes:** Geospatial Elective

**STAT 4910 - Internship**

1-6 Credits (Repeatable for credit)

**Prerequisite(s):** CORE 1000; CORE 1500\*

\* Concurrent enrollment allowed.

**Attributes:** UUC:Reflection-in-Action

**STAT 4930 - Special Topics**

3 Credits (Repeatable for credit)

**STAT 4980 - Advanced Independent Study in Statistics**

1 or 3 Credits (Repeatable for credit)

**STAT 5084 - Time Series**

3 Credits

Regression, ARIMA models, spectral analysis, state-space models and models in the frequency domain. Taught with statistical software.

**Prerequisite(s):** (STAT 3850 or MATH 3850)

**Attributes:** Bioinformatics & Comp Bio Elec, Grad Pol Sci Skills

**STAT 5085 - Mathematical Statistics**

3 Credits

Theory of estimators, sampling distributions, hypothesis testing and confidence intervals, regression, bootstrapping, resampling, introduction to Bayesian statistics and elementary experimental design.

**Prerequisite(s):** MATH 5080

**Attributes:** Bioinformatics & Comp Bio Elec

**STAT 5086 - Statistical Models**

3 Credits

STAT 5086 is a graduate level statistics course in random processes and their applications. This course will deal with the theory of discrete and continuous time Markov Chains, Brownian motion, stationary processes, stochastic calculus, and stochastic simulation methods (Markov Chain Monte Carlo). We will make use of R to simulate examples of stochastic processes.

**STAT 5087 - Applied Regression**

3 Credits

Linear regression, model selection, nonparametric regression, classification and graphical models. Theory and applications using statistical software.

**Attributes:** AI Principles, Bioinformatics & Comp Bio Elec

**STAT 5088 - Bayesian Statistics and Statistical Computing**

3 Credits

This course introduces Bayesian statistical methods and statistical computing techniques using statistical computing software. Topics include Bayesian models, Markov chain Monte Carlo, hierarchical modeling, model comparison and regression models.

**Attributes:** AI Principles, Bioinformatics & Comp Bio Elec, MPH-Epidemiology, MPH-Biostatistics

**STAT 5850 - Statistical Inference**

3 Credits

Point estimation, hypothesis testing, interval estimation, and asymptotic evaluations. This course is intended to follow a foundational course in probability such as MATH 4800.

**STAT 5930 - Special Topics**

3 Credits (Repeatable for credit)

**STAT 5980 - Graduate Independent Study in Statistics**

1 or 3 Credits (Repeatable for credit)