

# APPLIED STATISTICS-STAA (STAA)

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## Courses

### STAA 551 Regression Models and Applications Credits: 2 (2-0-0)

**Course Description:** Model estimation and goodness of fit for linear models; confidence intervals for prediction and estimation; lack of fit, model diagnostics, transformations, model selection, influential observations, collinearity, interaction, weighted least squares, imputation.

**Prerequisite:** MATH 369 and STAT 315.

**Restriction:** Must be a: Graduate.

**Registration Information:** Admission to the Master of Applied Statistics or admission to the Graduate Certificate in Theory and Applications of Regression Models. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

### STAA 552 Generalized Regression Models Credits: 2 (2-0-0)

**Course Description:** Categorical data analysis, estimation and testing for contingency tables, introduction to generalized linear models, logit and probit models for binary regression, extensions to nominal and ordinal multicategory responses, count data, Poisson and negative binomial regression, log-linear models.

**Prerequisite:** STAA 551, may be taken concurrently or STAR 512 or STAT 512 or STAT 540.

**Registration Information:** Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

### STAA 553 Experimental Design Credits: 2 (2-0-0)

**Course Description:** Analysis of variance, covariance, randomized block, latin square, factorial, balanced and unbalanced designs. Applications to agriculture, biosciences. Implementation in SAS and R.

**Prerequisite:** (STAA 551 or STAT 540) and (STAA 562 or STAT 530).

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

### STAA 554 Mixed Models Credits: 2 (2-0-0)

**Course Description:** Topics in linear models that have both fixed and random predictors: split-plot and related designs, mixed-effects factorials, repeated measures, random coefficients, and spatial models for designed experiments. Introduction to generalized linear and nonlinear mixed models. Statistical topics will be integrated with implementation in SAS and R.

**Prerequisite:** STAA 552.

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. Must have concurrent registration in STAA 553. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

### STAA 555 Statistical Consulting Skills Credit: 1 (1-0-0)

**Also Offered As:** STAT 555.

**Course Description:** Skills necessary to collaborate with non-statisticians. Communicate both verbally and in writing with collaborators while honing in on study objectives and identifying measures and factors. Readings of selected papers and texts and mock client sessions and shadowing. Common statistical tools necessary for statistical consulting will be reviewed.

**Prerequisite:** None.

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. Sections may be offered online. Credit not allowed for both STAA 555 and STAT 555.

**Term Offered:** Fall.

**Grade Mode:** Instructor Option.

**Special Course Fee:** No.

### STAA 556 Statistical Consulting Credits: 2 (2-0-0)

**Course Description:** Effective consulting to meet with clients, analyze real data, and prepare reports.

**Prerequisite:** STAA 500 to 599 - at least 28 credits.

**Registration Information:** Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Summer.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

### STAA 561 Probability with Applications Credits: 2 (2-0-0)

**Course Description:** Random variables, continuous and discrete distributions, expectations, joint and conditional distributions, moments and moment generating functions, transformations, order statistics.

**Prerequisite:** MATH 369 or STAT 315.

**Restriction:** Must be a: Graduate.

**Registration Information:** Admission to the Master of Applied Statistics or admission to the Graduate Certificate in Theory and Applications of Regression Models. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 562 Mathematical Statistics with Applications Credits: 2 (2-0-0)**

**Course Description:** Theory and applications of estimations, testing, and confidence intervals. Computer simulations, sampling from the normal distribution.

**Prerequisite:** STAA 561, may be taken concurrently or STAT 520.

**Registration Information:** Written consent of instructor. This is a partial-semester course.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 565 Quantitative Reasoning Credit: 1 (1-0-0)**

**Course Description:** Confounding, types of bias such as selection bias and regression effect bias, Simpson's paradox, experiments versus observational studies.

**Prerequisite:** STAA 551 or STAR 512, may be taken concurrently or STAT 512.

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 566 Data Visualization Methods Credit: 1 (1-0-0)**

**Course Description:** Principles of effective graphs, data visualization methods, grammar of graphics, multi-panel conditioning, exploratory data analysis using graphics, 3D plotting, ROC curves, data wrangling.

**Prerequisite:** STAA 551, may be taken concurrently or STAR 512, may be taken concurrently or STAT 512.

**Restriction:** Must be a: Graduate.

**Registration Information:** Admission to Master of Applied Statistics program or Graduate Certificate in Data Analysis. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 567 Computational and Simulation Methods Credit: 1 (1-0-0)**

**Course Description:** Statistical computation and simulation methods used to estimate probability distribution of non-standard test statistics, find estimators, test hypotheses, and compute confidence intervals. Optimization, bootstrapping, pivoting techniques.

**Prerequisite:** (STAA 551, may be taken concurrently or STAT 512, may be taken concurrently or STAT 540, may be taken concurrently) and (STAA 561, may be taken concurrently or STAT 511A or STAT 511B or STAT 520, may be taken concurrently).

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 568 Topics Industrial/Organizational Statistics Credit: 1 (1-0-0)**

**Course Description:** Six Sigma techniques, DMAIC, CT trees, VOC tools, data collection, process capability, capability metrics, graphical data exploration, and process control.

**Prerequisite:** (STAA 553, may be taken concurrently or STAR 512, may be taken concurrently or STAT 512) and (STAA 561 or STAR 511 or STAT 511A or STAT 520).

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 571 Survey Statistics Credits: 2 (2-0-0)**

**Course Description:** Survey design, simple random, stratified, and cluster samples. Estimation and variance estimation.

**Prerequisite:** (STAA 551 or STAT 540) and (STAA 562 or STAT 530).

**Registration Information:** Written consent of instructor. This is a partial semester course.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 572 Nonparametric Methods Credits: 2 (2-0-0)**

**Course Description:** Rank-based methods, nonparametric inferential techniques, scatterplot smoothing, nonparametric function estimation, environmental applications.

**Prerequisite:** (STAA 551, may be taken concurrently or STAR 512, may be taken concurrently or STAT 512 and STAT 540, may be taken concurrently) and (STAA 561, may be taken concurrently or STAR 511, may be taken concurrently or STAT 511A or STAT 511B or STAT 520, may be taken concurrently).

**Restriction:** Must be a: Graduate.

**Registration Information:** Graduate standing. This is a partial semester course.

**Term Offered:** Fall.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 573 Analysis of Time Series Credits: 2 (2-0-0)**

**Course Description:** Exploratory analysis of time series, including periodicity and trends, moving average and auto-regressive models, estimation and forecasting. Financial and environmental applications.

**Prerequisite:** (STAA 551, may be taken concurrently or STAT 540, may be taken concurrently) and (STAA 561, may be taken concurrently or STAT 520, may be taken concurrently).

**Restriction:** Must be a: Graduate.

**Registration Information:** Admission to Master of Applied Statistics program or Graduate Certificate in Data Analysis; students in the Graduate Certificate in Data Analysis require permission of the instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 574 Methods in Multivariate Analysis Credits: 2 (2-0-0)**

**Course Description:** Multivariate ANOVA, principal components, factor analysis, cluster analysis, discrimination analysis.

**Prerequisite:** STAA 551, may be taken concurrently and STAA 561.

**Registration Information:** Written consent of instructor. This is a partial semester course.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 575 Applied Bayesian Statistics Credits: 2 (2-0-0)**

**Course Description:** Bayesian analysis of statistical models, prior and posterior distributions, computing methods, interpretation.

**Prerequisite:** (STAA 552) and (STAA 562 or STAT 530) and (STAA 567).

**Registration Information:** Written consent of instructor. This is a partial semester course.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 576 Methods in Spatial Statistics Credits: 2 (2-0-0)**

**Course Description:** Covariance estimation, covariance/variogram models, spatial regression models, spatial prediction, spatial point patterns.

**Prerequisite:** (STAA 552) and (STAA 561 or STAT 520).

**Restriction:** Must not be a Graduate.

**Registration Information:** Graduate standing. Written consent of instructor. This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 577 Statistical Learning and Data Mining Credits: 2 (2-0-0)**

**Course Description:** Applications-oriented overview into how to use statistical methods to do data mining, inference, and prediction.

**Prerequisite:** STAA 551, may be taken concurrently and STAA 561.

**Registration Information:** This is a partial semester course. Sections may be offered: Online.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.

**STAA 578 Machine Learning Credits: 2 (2-0-0)**

**Course Description:** K-means clustering, perceptron algorithm, evaluating model performance, neural networks, learning theory and dimension reduction.

**Prerequisite:** STAA 577, may be taken concurrently.

**Restriction:** Must be a Graduate.

**Registration Information:** Graduate standing. This is a partial semester course. Sections may be offered: Online. Credit not allowed for both CS 545 and STAA 578.

**Term Offered:** Spring.

**Grade Mode:** Traditional.

**Special Course Fee:** No.