<table>
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<th>COURSE CODE</th>
<th>COURSE TITLE</th>
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<tr>
<td>STAA 551 02(2-0-0)</td>
<td>Regression Models and Applications</td>
<td>F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course. Estimation/hypothesis testing methods: t-test, ANOVA, regression, residual analyses, transformations, goodness of fit, interactions, confounding.</td>
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<tr>
<td>STAA 552 02(2-0-0)</td>
<td>Generalized Regression Models</td>
<td>F. Prerequisite: STAA 551 or written consent of instructor. This is a partial-semester course. Nonlinear regression iteratively reweighted least squares, doseresponse models, count data, multi-way tables, survival analysis.</td>
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<tr>
<td>STAA 553 02(2-0-0)</td>
<td>Experimental Design</td>
<td>S. Prerequisite: (STAA 552 and STAA 562) or written consent of instructor. This is a partial-semester course. Design/analysis of experiments. Emphasis on balanced design; use of computing packages SAS and R. Example based presentation, rather than theoretical.</td>
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<tr>
<td>STAA 554 02(2-0-0)</td>
<td>Mixed Models</td>
<td>S. Prerequisite: STAA 553 or written consent of instructor. This is a partial-semester course. Topics in linear, generalized linear, and nonlinear models with fixed and random predictors, balanced and unbalanced cases.</td>
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<tr>
<td>STAA 555 03(3-0-0)</td>
<td>Statistical Consulting</td>
<td>SS. Prerequisite: (STAA 554; STAA 562) or written consent of instructor. Effective consulting to meet with clients, analyze real data, and prepare reports.</td>
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<tr>
<td>STAA 561 02(2-0-0)</td>
<td>Probability with Applications</td>
<td>F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course. Random variables, continuous and discrete distributions, expectations, join and conditional distributions, transformations.</td>
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<tr>
<td>STAA 562 02(2-0-0)</td>
<td>Mathematical Statistics with Applications</td>
<td>F. Prerequisite: STAA 561 or written consent of instructor. This is a partial-semester course. Theory and applications of estimations, testing, and confidence intervals. Computer simulations, sampling from the normal distribution.</td>
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<tr>
<td>STAA 565 01(1-0-0)</td>
<td>Quantitative Reasoning</td>
<td>F. Prerequisite: Concurrent registration in STAA 551 or written consent of instructor. This is a partial-semester course. Confounding, types of bias such as selection bias and regression effect bias, Simpson’s paradox, experiments versus observational studies.</td>
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<tr>
<td>STAA 566 01(1-0-0)</td>
<td>Computational and Graphical Methods</td>
<td>F. Prerequisite: Admission to the M.A.S. program or written consent of instructor. This is a partial-semester course. Exploratory data analysis using graphics, effective communication with graphs, data reduction methods.</td>
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<tr>
<td>STAA 567 01(1-0-0)</td>
<td>Computational and Simulation Methods</td>
<td>S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course. Methods to estimate probability distribution of nonstandard test statistics, find estimators, test hypotheses, and compute confidence intervals.</td>
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<tr>
<td>STAA 568 01(1-0-0)</td>
<td>Topics Industrial/Organizational Statistics</td>
<td>S. Prerequisite: (STAA 551; STAA 561) or written consent of instructor. This is a partial-semester course. Quality management, process control, reliability, decision making.</td>
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</table>

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STATISTICS COURSES
Department of Statistics
College of Natural Sciences

STAT 101 03(2-2-0). Activity Based Statistics. F, SS. Credit not allowed for students who have already taken any 200-level or higher statistics course. Population, sample, variation, data, relationships, probability and risk, polls, prediction, margin of error, critical assessment of studies.

STAT 110 03(2-0-1). Statistical Thinking: Concepts and Applications. S. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Use of statistical tools in real-life problems encountered using computer packages; integration of critical thinking skills using case studies.

STAT 192 01(0-0-1). First-Year Seminar in Mathematical Sciences. S. Richness and variety of problems encountered in the mathematical sciences.

STAT 201 03(2-0-1). General Statistics. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 201 and STAT 204. Intended as a one semester terminal course.

Graphs, descriptive statistics, confidence intervals, hypothesis tests, correlation and simple regression, tests of association.

STAT 204 03(2-2-0). Statistics for Business Students. F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 204 and STAT 201.

Surveys, sampling, descriptive statistics, confidence intervals, contingency tables, control charts, regression, exponential smoothing, forecasting.

STAT 301 03(3-0-0). Introduction to Statistical Methods. (GT-MAI) F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (NT-V)

STAT 303/ECE 303 03(3-0-0). Introduction to Communications Principles. F. Prerequisite: ECE 311 or concurrent registration; MATH 261. Credit not allowed for both STAT 303 and ECE 303.

Basic concepts in design and analysis of communication systems.

STAT 305 03(3-0-0). Sampling Techniques. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Sample designs: simple random, stratified, systematic, cluster, unequal probability, two phase; methods of estimation and sample size determination.

STAT 307 03(3-0-0). Introduction to Biostatistics. F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

STAT 311 03(3-0-0). Statistics for Behavioral Sciences I. F. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

STAT 312 03(3-0-0). Statistics for Behavioral Sciences II. S. Prerequisite: STAT 311.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

STAT 315 03(3-0-0). Statistics for Engineers and Scientists. F, S, SS. Prerequisite: MATH 161 or MATH 255. Credit allowed for only one course: ERHS 307, STAT 301, STAT 307, STAT 311, STAT 315.

Calculus-based probability and statistics: distribution theory, estimation, hypothesis testing, applications to engineering and the sciences. (NT-V)

STAT 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling. S. Prerequisite: CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160.

Probabilistic and stochastic models of real phenomena; distributions, expectations, correlations; averages; simple Markov chains and random walks.

STAT 340 03(3-0-0). Multiple Regression Analysis. S, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Estimation and testing for linear, polynomial, and multiple regression models; analysis of residuals; selection of variables; nonlinear regression.

STAT 350 03(3-0-0). Design of Experiments. F, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Analysis of variance, covariance; randomization; completely randomized, randomized block, latin-square, split-plot, factorial and other designs.

STAT 372 03(3-0-0). Data Analysis Tools. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Data analysis principles and practice, statistical packages and computing; ANOVA, regression and categorical data methods.

STAT 420 03(3-0-0). Probability and Mathematical Statistics I. F. Prerequisite: MATH 255 or MATH 261.

Probability, random variables, distribution functions, and expectations; joint and conditional distributions and expectations; transformations.

STAT 430 03(3-0-0). Probability and Mathematical Statistics II. S. Prerequisite: STAT 420.

Theories and applications of estimation, testing, and confidence intervals; sampling distributions including normal, gamma, beta X²*, t, and F.

STAT 460 03(3-0-0). Applied Multivariate Analysis. S. Prerequisite: STAT 340.

Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis. (NT-V)

STAT 472 03(0-0-3) Statistical Consulting. S. Prerequisite: STAT 372.

Statistical consulting skills including data analysis, problem solving, report writing, oral communication, and planning experiments.

STAT 495 Var. Independent Study. Prerequisite: Written consent of instructor.

STAT 498 Var [1-3]. Undergraduate Research in Statistics. Prerequisite: Written consent of instructor.

Research skills and techniques; include both oral and written communication of results.

STAT 500 01(0-2-0). Statistical Computer Packages. S. Prerequisite: STAT 340; STAT 350.

Comparison, evaluation, and use of computer packages for univariate and multivariate statistical analyses.

STAT 501 01(1-0-0). Statistical Science. F.

Overview of statistics: theory; use in agriculture, business, environment, engineering; modeling; computing; statisticians as researchers/consultants.

STAT 511 04(3-0-1). Design and Data Analysis for Researchers I. F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

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STAT 512 04(3-0-1). Design and Data Analysis for Researchers II. S. Prerequisite: STAT 511.
Statistical methods for experimenters and researchers emphasizing design and analysis of experiments. (NT-V)

STAT 514/SOCR 514 04(3-3-0). Agricultural Experiment Design and Analysis. S. Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.
Design and implementation of agricultural experiments and statistical analysis of resulting data.

STAT 515 03(2-2-0). Statistical Science and Process Improvement. S. Prerequisite: QNT 570 or STAT 511 or STAT 540.
Statistical methods in process design; statistical methods; measurement processes; customer evaluation.

STAT 520 04(4-0-0). Introduction to Probability Theory. F. Prerequisite: MATH 369; MATH 261; MATH 317.
Probability, random variables, distributions, expectations, generating functions, limit theorems, convergence, random processes.

STAT 521 03(3-0-0). Stochastic Processes I. S. Prerequisite: STAT 520.
Characterization of stochastic processes, Markov chains in discrete and continuous time, branching processes, renewal theory, Brownian motion.

STAT 522 03(3-0-0). Stochastic Processes II. F, SS. Prerequisite: STAT 521.
Martingales and applications, random walks, fluctuation theory, diffusion processes, point processes, queuing theory.

STAT 523/NR 523 03(3-0-0). Quantitative Spatial Analysis. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 523 and NR 523.
Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

STAT 524/FIN 524 03(3-0-0). Financial Statistics. F. Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.
Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

STAT 525 03(3-0-0). Analysis of Time Series I. F. Prerequisite: STAT 430.
Trend and seasonality, stationary processes, Hilbert space techniques, spectral distribution function, fitting ARIMA models, linear prediction.

STAT 526 03(3-0-0). Analysis of Time Series II. S, SS. Prerequisite: STAT 525.
Spectral analysis; the periodogram; spectral estimation techniques; multivariate time series; linear systems, optimal control; Kalman filtering, prediction.

STAT 530 03(3-0-0). Mathematical Statistics. S. Prerequisite: STAT 520.
Sampling distributions, estimation, testing, confidence intervals; exact and asymptotic theories of maximum likelihood and distribution-free methods.

STAT 540 03(3-0-0). Data Analysis and Regression. F. Prerequisite: Six credits of upper-division statistics courses.
Introduction to multiple regression and data analysis with emphasis on graphics and computing.

STAT 544/ERHS 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S. Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 544 and ERHS 544.
Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

STAT 547/CIVE 547 03(3-0-0). Statistics for Environmental Monitoring. S. Prerequisite: STAT 301. Credit not allowed for both STAT 547 and CIVE 547.
Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

STAT 548/CS 548 04(3-2-0). Bioinformatics Algorithms. F. Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.
Computational methods for analysis of DNA/protein sequences and other biological data.

STAT 560 03(3-0-0). Applied Multivariate Analysis. F, S. Prerequisite: STAT 520; STAT 540.
Multivariate analysis of variance; principal components; factor analysis; discriminant analysis; cluster analysis. (NT-O/V)

STAT 570 53(3-0-0). Nonparametric Statistics. S, SS. Prerequisite: STAT 430.
Distribution and uses of order statistics; nonparametric inferential techniques, their uses and mathematical properties. (NT-V)

Instruction on planning studies, writing reports, and interacting with clients. Attend and critique consulting sessions.

STAT 592 01(0-0-1). Seminar.

STAT 600 03(3-0-0). Statistical Computing. F. S. Prerequisite: STAT 520; STAT 540.
Optimization and integration in statistics; Monte Carlo methods; simulation; bootstrapping; density estimation; smoothing.

STAT 604/BUS 604 02(2-0-0). Managerial Statistics. F. Prerequisite: Admission to the MBA Program. Credit not allowed for both STAT 604 and BUS 604.
Introduction to statistical thinking and methods used to support managerial-decision making. (NT-V)

STAT 605 03(3-0-0). Theory of Sampling Techniques. S. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315; STAT 430.
Survey designs; simple random, stratified, cluster samples; theory of estimation; optimization techniques for minimum variance or costs.

STAT 640 04(4-0-0). Design and Linear Modeling I. S. Prerequisite: MATH 369; STAT 540.
Introduction to linear models; experimental design; fixed, random, and mixed models.

STAT 645 03(3-0-0). Categorical Data Analysis and GLIM. S. Prerequisite: Concurrent registration in STAT 640.
Generalized linear models, binary and polynomous data, log linear models, quasilikelihood models, survival data models.

STAT 650 03(3-0-0). Design and Linear Modeling II. F. Prerequisite: STAT 640.
Mixed factorials; response surface methodology; Taguchi methods; variance components.

L) Medical/pharmaceutical statistical methods (NT-V).

STAT 684 Var [1-3]. Supervised College Teaching. Prerequisite: Enrollment in M.S./Ph.D. program in statistics.
Guidance and instruction in effective teaching of college courses in statistics.

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STAT 695 Var. Independent Study.


STAT 720 04(4-0-0). Probability Theory. S. Prerequisite: MATH 517; STAT 520.
Measure theoretic probability, characteristic functions; convergence; laws of large numbers; central limit, extreme value, asymptotic theory.

STAT 721 03(3-0-0). Applied Probability and Stochastic Processes I. F.
S. Prerequisite: STAT 720.
General theory of processes; Markov processes in discrete, continuous time; review of martingales, random walks; renewal and regenerative processes.

STAT 722 03(3-0-0). Applied Probability and Stochastic Processes II. F,
S, SS. Prerequisite: STAT 720.
Brownian motion, diffusion, stochastic differential equations; weak convergence, central limit theorems. Applications in engineering, natural sciences.

STAT 725 03(3-0-0). Time Series and Stationary Processes. F, S, SS.
Prerequisite: STAT 720; STAT 730.
Spectral theory of multivariate stationary processes; estimation, testing for spectral, linear, AR-MA representations; best linear predictors, filters.

STAT 730 04(4-0-0). Advanced Theory of Statistics I. F. Prerequisite:
STAT 530; STAT 720.
Minimal sufficiency, maximal invariance; Neyman-Pearson theory; Fisher, Kullback-Leibler information; asymptotic properties of maximum-likelihood methods.

STAT 731 03(3-0-0). Advanced Theory of Statistics II. S, SS.
Prerequisite: STAT 730.
Decision-theory model; Bayes, e-Bayes, complete, and admissible classes; applications to sequential analysis and design of experiments.

STAT 740 03(3-0-0). Advanced Statistical Methods. F, S. Prerequisite:
STAT 640; concurrent registration in STAT 730.
Generalized additive models; recursive partitioning regression and classification; graphical models and belief networks; spatial statistics.

STAT 750 03(3-0-0). Advanced Theory of Design. F, S. Prerequisite:
STAT 650.
Information theory; design evaluation, factorial designs and optimal designs, orthogonal and balanced arrays, designs with discrete/continuous factors.

STAT 760 03(3-0-0). Theory of Multivariate Statistics. F, S.
Prerequisite: STAT 640; concurrent registration in STAT 730.
Theory of multivariate normal; maximum-likelihood inference, union-intersection testing for single sample; theory of a multivariate linear model.

STAT 770 03(3-0-0). Approximation Theory and Methods. F, S.
Prerequisite: STAT 730.
Edgeworth expansions, saddlepoint methods; applications of weak convergence and other approximation methods in mathematical statistics.

STAT 792 01(0-0-1). Seminar.

STAT 793 03(3-0-0). Seminar on Advanced Statistical Methods. F, S.
Prerequisite: STAT 640; concurrent registration in STAT 730. May be taken up to two times for credit.

STAT 795 Var. Independent Study.

STAT 796 Var. Group Study.
Methodology, stochastic processes, experimental design, multidimensional statistics.


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