STATISTICS (STAT)

STAT 5333. Design and Analysis of Experiments. 3 Hours.
Topics include the design, analysis and interpretation of results from standard experimental design models including the completely randomized design, the randomized complete block, the incomplete block, factorial models, Latin squares, Greco-Latin squares, screening designs, fractional factorials, and general fixed, mixed and random effects ANOVA models.
Prerequisite: STAT 4372 (or equivalent).

STAT 5360. Special Topics In Statistics. 3 Hours.
Topics are selected from emerging areas in statistics that are not covered in regular courses. Such topics as data mining, statistical learning, pattern recognition, spatial statistics, statistical methods in finance, functional data analysis, life contingencies may be included. Also listed as MATH 5360.
Prerequisite: Consent of instructor.

STAT 5361. Theory and Application of Probability. 3 Hours.
Topics include probability axioms and properties, conditional probability, random variables, probability distributions, moment generating functions, laws of large numbers and the Central Limit Theorem. Also listed as MATH 5361.
Prerequisite: STAT 4372 (or equivalent) or consent of instructor.

STAT 5362. Theory and Application of Statistics. 3 Hours.
Topics include convergence in probability and distribution, point estimation, hypothesis testing, interval estimation, maximum likelihood methods, properties of estimators such as efficiency, sufficiency and completeness, exponential family of distributions, most powerful tests, uniformly most powerful tests, and likelihood ratio tests.
Prerequisite: STAT 5361 (or equivalent) or consent of instructor.

STAT 5364. Applied Multivariate Statistical Analysis. 3 Hours.
Topics include the multivariate normal distribution, inferences about a mean vector, comparisons of several multivariate means, principal components analysis, clustering, discriminant and classification analysis.
Prerequisite: STAT 4372 (or equivalent) or consent of instructor.

STAT 5365. Linear Statistical Models. 3 Hours.
Topics include the statistical properties of quadratic forms, the full-rank general linear statistical model, the less-than-full-rank model, the linear model structure of regression models, ANOVA models, ANCOVA models, the general characteristics of the fixed, mixed and random effects models and model diagnostics considerations.
Prerequisite: STAT 4372 or STAT 5362 (or equivalents).

STAT 5366. Sampling Methods. 3 Hours.
Topics include the theory and applications of standard methods for performing scientific-based sampling. Among these are simple random sampling, cluster sampling, stratified random sampling, systematic sampling, probability proportional to size (pps) sampling, sampling from finite populations and ratio regression estimation.
Prerequisite: STAT 4372, STAT 5362, or consent of instructor.

STAT 5367. Reliability Analysis and Quality Control. 3 Hours.
Topics include measures of failure, reliability functions, failure models, life testing and censoring, system reliability, parameter estimation and testing, control charting, acceptance sampling plans, software reliability and process control.
Prerequisite: STAT 4372, STAT 5362, or consent of instructor.

STAT 5368. Regression Modeling & Analysis. 3 Hours.
Topics include model estimation and testing, simple and multiple regression models, residual analysis, variables selection, polynomial regression, multicollinearity, ridge regression, logistic regression and real data analysis and applications.
Prerequisite: STAT 4372, STAT 5362, or consent of instructor.

STAT 5369. Statistical Computing and Consulting. 3 Hours.
This course consists of a detailed study of the SAS package including SAS/BASICS, SAS/STAT, SAS/GRAPH and SAS/IML with emphasis on applying these tools in a consulting environment. Techniques and principles important in working with representatives of user disciplines are included.
Prerequisite: STAT 3380 and graduate standing.

STAT 5370. Nonparametric Statistics. 3 Hours.
Topics include order statistics, contingency analysis, rank tests (Wilcoxin signed-rank test, Mann-Whitney U test and others), distribution-free tests of location and scale, nonparametric regression, Kendall's tau and related areas.
Prerequisite: STAT 4372 (or equivalent) or consent of instructor.

STAT 5390. Statistical Learning. 3 Hours.
Students learn essential modeling and prediction techniques and toolsets for classical and modern statistical learning and concentrate on their applications to statistical modeling and prediction problems. Particularly, students implement statistical learning models using well-established statistical software packages and tools in R, Python, and MATLAB, and analyze patterns and information discovered from target data. Topics may include linear regression, classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, clustering, deep learning, survival analysis, multiple testing, and recent research trends.
Prerequisite: Approval by the Graduate Advisor.

STAT 6060. Independent Study. 1-3 Hours.
Students research a subject in depth under the direct supervision of a faculty member with expertise in the particular area of study. The topic of study will be mutually selected and approved by the student and Statistics faculty member. Variable Credit (1 to 3).
Prerequisite: Consent of instructor.

STAT 6099. Research and Thesis. 1-3 Hours.
This course continues the thesis research and concludes with a carefully written solution of the thesis problem and a satisfactory oral presentation of the results. Study must be supervised by a member of the graduate statistics faculty. Variable Credit (1-3). Course Equivalents: STAT 6399
Prerequisite: STAT 6398.

STAT 6366. Applied Bayesian Analysis. 3 Hours.
This course presents Bayesian methods and their application to fields such as agriculture, biology, criminal justice and medicine. Topics include basic models that use the binomial, normal, poisson and gamma distributions; complex models that apply Markov Chain Monte Carlo methods like the Gibbs sampler and the Metropolis-Hastings algorithm; model selection and evaluation of model adequacy. Software current to the discipline will be used to analyze data.
Prerequisite: STAT 4372 or departmental approval.

STAT 6375. Biostatistics. 3 Hours.
This course consists of the topics related to statistical methods in biomedical studies: Types of biomedical study designs, assessment of risk factors, measure of disease-exposure association, logistic regression, analysis of count data, analysis of event-time data, and resampling methods.
Prerequisite: STAT 4372 or departmental approval.

STAT 6376. Time Series Analysis. 3 Hours.
This course presents both classical and modern approaches to time series analysis. Topics include autoregressive integrated moving average models, exponential smoothing models, and time series regression methods. Emphasis is placed on building time series models for forecasting.
Prerequisite: STAT 4372 or departmental approval.

STAT 6377. Introduction to Survival Analysis. 3 Hours.
Students explore both the theory and real-world applications of survival analysis in the biomedical and engineering fields. Topics may include nonparametric, semiparametric, and parametric survival methods, model diagnostics, and modern techniques for survival analysis methods. Statistical software such as SAS and R will be used to analyze data.
Prerequisite: STAT 5361 or approval of the instructor.

STAT 6378. Longitudinal Data Analysis. 3 Hours.
Students explore the statistical analysis of longitudinal data. This course focuses on modern statistical methods for longitudinal data and their applications in real world problems. Topics may include repeated measures, modeling longitudinal data, analysis of variance in repeated measures, population averaged models, linear mixed effect models, generalized estimating equations, and generalized linear mixed effect models. Statistical software such as SAS and R will be used extensively to analyze data.
Prerequisite: STAT 4372 (or equivalent) or approval of the instructor.

STAT 6380. Statistics Practicum. 3 Hours.
Students work on a specific research topic under a faculty member's supervision. The specific topic or problem will be chosen from current trends and future directions in statistics. Therefore, the course content varies based upon the topic that both the student and the mentoring faculty member choose. The practicum experience provides students the opportunity to apply and integrate knowledge acquired through coursework.
Prerequisite: Consent of instructor.

STAT 6398. Research And Thesis. 3 Hours.
This course includes a study of research methods in statistics, identification of an appropriate thesis problem and the preparatory work leading to a plan for its solution. Study must be supervised by a member of the graduate statistics faculty.
Prerequisite: STAT 5362.

STAT 7365. Statistical Methods for Decision Making. 3 Hours.
Topics covered are oriented toward statistical methods supporting the decision environment. Topics include estimation, hypothesis testing, statistical modeling and decision methods.
Prerequisite: 3 Credit hour of graduate-level, introductory probability and statistics or the equivalent.