Mathematics (MTH) - Graduate Courses

Courses

MTH 405/505 Cr.3
Statistical Methods
A survey of statistical methods from the point of view of how these methods are implemented with a standard statistics software package. Topics include descriptive statistics, graphical methods, tests of location, goodness of fit, simple and multiple regression, design of experiments, ANOVA, multiple comparisons, chi-square tests. Both parametric and nonparametric methods are treated. Computer use is an integral part of the course. Prerequisite: grade of "C" or better in MTH 145 or MTH 245. Offered Fall.

MTH 443/543 Cr.3
Categorical Data Analysis
An introduction to categorical data analysis covering summaries and inference for categorical response and count data, analysis of contingency tables, generalized linear models for binary and count data, logistic regression, multiclassification logit models, and loglinear models for contingency tables with an emphasis on applications and implementation using computer software. Prerequisite: grade of "C" or better in MTH 245 or MTH 405/505. Offered Fall - Even Numbered Years.

MTH 445/545 Cr.3
Correlation and Regression Analysis
An introduction to simple linear regression, multiple regression, polynomial regression. Inferences, appropriateness of model, model diagnostics/adequacy, difficulties in the application of models are discussed. A computer package will be used. Course participants will be involved with hands-on statistical applications and consulting. Prerequisite: grade of "C" or better in MTH 245 or MTH 405/505. Offered Fall.

MTH 446/546 Cr.3
Analysis of Variance and Design of Experiments
An introduction to single factor, and randomized block designs in analysis of variance. Inferences, appropriateness of model, model diagnostics/adequacy, difficulties in the application of models are discussed. Design or structure of an experiment will be discussed. A computer package will be used. Course participants will be involved with hands-on statistical applications and consulting. Prerequisite: grade of "C" or better in MTH 245 or MTH 405/505. Offered Spring - Odd Numbered Years.

MTH 447/547 Cr.3
Nonparametric Statistics
An introductory course presenting the theory and procedures for using distribution-free methods in data analysis. Standard procedures, such as the Wilcoxon tests, Kruskal-Wallis, Kolmogorov-Smirnov, nonparametric confidence intervals, regression analysis, and powers of the tests will be included. Computer programs will be used when appropriate. Prerequisite: grade of "C" or better in MTH 245 or MTH 405. Offered Spring - Even Numbered Years.

MTH 449/549 Cr.3
Applied Multivariate Statistics
An introduction to applied multivariate statistical methods covering multivariate analysis of variance, multivariate analysis of covariance, repeated measures design, factor analysis, principle component analysis, cluster analysis, discriminate analysis, and multivariate regression. Course participants will be involved with hands-on statistical applications. Prerequisite: grade of "C" or better in MTH 245 or MTH 405. Offered Fall - Odd Numbered Years.

MTH 495/595 Cr.1-3
Special Topics in Mathematics
Special topics in mathematics not covered by regular courses taught in this department, such as topology, set theory and advanced numerical analysis. The particular topic is decided by the instructor. Offered Occasionally.

MTH 496/596 Cr.1-3
Special Topics in Statistics
Special topics in statistics not covered by regular courses taught in this department. The particular topic is decided by the instructor. Offered Occasionally.

MTH 651 Cr.1
Number and Operations in Middle School Mathematics
A study of the mathematical concepts, properties and techniques that are fundamental to integers, rational and irrational numbers, and other number systems. Emphasis is on using mathematical reasoning, explaining concepts, justifying statements with informal logical arguments, developing mathematical models and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Students will be expected to become knowledgeable with the results of research in the teaching and learning of numbers and operation with numbers. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 652 Cr.1
Geometry and Measurement for Middle School Teachers
A study of the mathematical concepts, properties and techniques that are fundamental to two- and three-dimensional geometry, including measurement, transformations, constructions, definitions, and proofs. Emphasis is on using mathematical reasoning, explaining concepts, justifying statements with informal logical arguments, developing mathematical models and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Students will be expected to become knowledgeable with the results of research in the teaching and learning of geometry. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 653 Cr.1
Algebraic Reasoning in Middle School Mathematics
A study of the mathematical concepts, properties and techniques that are fundamental to the development of algebraic structures, including variables, patterns, algebraic expressions and operations, and solving equations. Emphasis is on using mathematical reasoning, explaining processes, describing and modeling real-world phenomena and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Students will be expected to become knowledgeable with the results of research in the teaching and learning of algebraic concepts. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 654 Cr.1
Probability for Middle School Teachers
A study of the mathematical concepts, properties and techniques that are fundamental to probability, including counting techniques, expected value, probability distributions, and conditional probability. Emphasis is on using mathematical reasoning, explaining concepts, interpreting probabilities, applying both experimental and theoretical techniques to solve problems and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Students will be expected to become familiar with the results of research in the teaching and learning of probability concepts. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.
MTH 655 Cr.1
Statistics in Middle School Mathematics
A study of the mathematical concepts, properties and techniques that are fundamental to statistical analysis. Emphasis is on collecting, interpreting, and analyzing data, using the results of data analysis to make predictions and confirm or deny hypotheses, and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Technology is used to generate displays, compute summary statistics and design presentations. Students will be expected to become familiar with the results of research in the teaching and learning of statistics. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 656 Cr.1
Functions and Graphs in Middle School Mathematics
A study of the mathematical properties, graphs and applications of linear, quadratic, polynomial, exponential and power functions. Emphasis is on recognizing functional relationships, demonstrating the relationship between a function and its graph, describing and modeling real-world phenomena and integrating knowledge from different areas of mathematics as appropriate for middle school mathematics. Students will be expected to become knowledgeable with the results of research in the teaching and learning of concepts relating to functional relationships and graphical representations. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 657 Cr.2
Mathematical Problem Solving in Middle School Mathematics
A study of general mathematical processes and techniques that are used to solve problems in middle school mathematics. Emphasis is on communicating logical arguments, applying a variety of problem-solving strategies, using appropriate mathematical language and analyzing both routine and non-routine problems encountered in middle school mathematics. Issues relating to the methods, materials, and the research-based teaching strategies of problem solving at the middle school level will also be discussed. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 658 Cr.2
Mathematical Assessment in Middle School Mathematics
A study of current strategies and techniques to assess student knowledge and problem-solving ability in mathematics. Emphasis is on connecting assessment theory and models to teachers’ practices through recognizing student errors and misconceptions, identifying prerequisite knowledge necessary for understanding of mathematical concepts, developing constructed-response questions and creating performance-based activities for assessing both procedural and conceptual mathematical understanding, and implementation of an action research plan. Prerequisite: admission to the Middle School Mathematics Certificate Program. Offered Occasionally.

MTH 697 Cr.1-3
Special Topics in Mathematics
Special topics in mathematics, mathematics education and statistics not covered by regular courses taught in the mathematics department. The particular topic selected to be determined by the mathematics department according to need and interest. Repeatable for credit. Consent of instructor. Offered Occasionally.

MTH 796 Cr.1-3
Directed Studies
Directed readings or presentation of special topics in mathematics. Repeatable for credit - maximum six. Consent of instructor. Offered Occasionally.