MASTER OF SCIENCE IN EDUCATION

Requirements

Candidates for the degree of Master of Science in Education with a concentration in Secondary Education/Mathematics must complete thirty (30) credits of approved courses offered by the Department of Mathematics/Computer Science and the Department of Education. Of these thirty credits, eighteen (18) credits shall be in approved 400-level courses offered by the Department of Mathematics and Computer Science. Requirements for the Education component of the Master of Science degree in Education with a concentration in Secondary Education/Mathematics are listed under the Education section earlier in this bulletin.

MTH. MATHEMATICS

MTH-414. COMPLEX ANALYSIS
Credits: 3
Complex functions, limit, continuity, analytic functions, power series, contour integration, Laurent expansion, singularities and residues.

Pre-Requisites
[[MTH-212]] (Multivariable Calculus) or consent of instructor.

MTH-431. ABSTRACT ALGEBRA I
Credits: 4
A rigorous treatment of fundamental concepts in algebra, with emphasis on careful reasoning and proofs. Topics covered include equivalence relations, binary operations. Integers: divisibility, factorization, integers modulo n, elementary group theory, subgroups, cyclic groups, permutation groups, quotient groups. Homomorphisms and isomorphisms. Introductory topics in ring theory as time permits.

Pre-Requisites
[[MTH-302]] (Introduction to Higher Mathematics) or consent of instructor

MTH-432. ABSTRACT ALGEBRA II
Credits: 3
A continuation of [[MTH-431]]. Includes the study of polynomial rings, ideals, field extensions and Galois Theory.

Pre-Requisites
[[MTH-431]] (Abstract Algebra).

MTH-442. TOPOLOGY
Credits: 3
An introduction to point-set topology, including a study of metric spaces, topological spaces, countability and separation axioms, compactness, connectedness, product spaces.

Pre-Requisites
[[MTH-411]] (Real Analysis) or consent of instructor.

MTH-443. GEOMETRY
Credits: 3
A study of selected topics from Euclidean and non-Euclidean geometry.

Pre-Requisites
[[MTH-302]] (Introduction to Higher Mathematics) or consent of instructor

MTH-451. PROBABILITY AND MATHEMATICAL STATISTICS I
Credits: 3
Random variables, probability distributions, expectation and limit theorems, confidence intervals.

Pre-Requisites
A one-year calculus sequence or consent of instructor.

MTH-452. PROBABILITY AND MATHEMATICAL STATISTICS II
Credits: 3
Hypothesis testing, non-parametric methods, multivariate distributions, introduction to linear models.

Pre-Requisites
[[MTH-451]] or consent of instructor.

MTH-454. STATISTICAL METHODOLOGY
Credits: 3
This course emphasizes applications, using statistical computer packages (R, SPSS) and real data sets from a variety of fields. Topics include estimation and testing; stepwise regression; analysis of variance and covariance; design of experiments; contingency tables; and multivariate techniques, including logistic regression.

Pre-Requisites
[[MTH-451]] or consent of instructor.

MTH-461. PARTIAL DIFFERENTIAL EQUATIONS
Credits: 3
Fees: $40

Offered fall of odd years.

Pre-Requisites
[[MTH-211]] and [[MTH-212]]

MTH-462. ADVANCED CALCULUS
Credits: 3
Fees: $40
Topics from advanced calculus, including matrix representation of differentials and the multivariable chain rule, vector calculus, curvilinear coordinates, change of variables in higher dimensions, improper multiple integrals, applications of line and surface integrals, differential forms and the general Stokes’ theorem, potential theory, and Taylor’s formula for functions of several variables.

Offered fall of even years

Pre-Requisites
[[MTH-212]] (Multivariable Calculus)
MTH-463. OPERATIONS RESEARCH  
Credits: 3
A survey of operations research topics such as decision analysis, inventory models, queuing models, dynamic programming, network models, and linear programming. Cross-listed with [CS-463]. Offered in the spring semester of odd-numbered years when demand warrants.

Pre-Requisites
Programming experience in a high-level language and completion of a one-year calculus sequence.

MTH-464. NUMERICAL ANALYSIS  
Credits: 3
An introduction to numerical algorithms as tools to providing solutions to common problems formulated in mathematics, science, and engineering. Focus is given to developing the basic understanding of the construction of numerical algorithms, their applicability, and their limitations. (Cross-listed with [CS-464])

Pre-Requisites
Programming experience in a high-level language and completion of a one-year calculus sequence.

MTH-465. NUMERICAL LINEAR ALGEBRA  
Credits: 3
Direct and iterative methods for the solution of systems of linear equations, matrix decompositions, computation of eigenvalues and eigenvectors, and relaxation techniques. The theoretical basis for error analysis including vector and matrix norms. Applications such as least squares and finite difference methods. Offered spring semester of even-numbered years.

Pre-Requisites
MTH 214 and CS 125 (or equivalent programming experience)

MTH-470. READINGS IN MATHEMATICS  
Credits: 3

Pre-Requisites
Consent of Mathematics Department Chairperson May be repeated for credit if a different topic is selected.

MTH-511. MEASURE AND INTEGRATION  
Credits: 3
Measures, measurable functions, integration, convergence theorems, product measures, signed measures.

Pre-Requisites
[MTH-442] or consent of instructor.

MTH-513. FUNCTIONAL ANALYSIS  
Credits: 3
Topics include: Banach spaces, Lp-spaces, Hilbert spaces, topological vector spaces, and Banach algebra.

Pre-Requisites
[MTH-411] and a course in linear algebra.