MATH EDUCATION (MED)

MED 551 History of Mathematics (3 credits)
A survey of the development of mathematical ideas and techniques in
social and cultural contexts. The trajectories of certain key problems will
be followed, such as the nature of the Euclidean parallel postulate, the
plane isoperimetric theorem and the solution of polynomial equations.
The influence of practical needs (business, military, technological) will be
considered. Prerequisites: Calculus II or permission of the MED director.
Restrictions: Enrollment is limited to Graduate level students.

MED 552 Number Theory (3 credits)
The study of integers, primes and factorization, Division Algorithm,
Euclidean algorithm, Mathematical Induction, the Fundamental Theorem
of Arithmetic, linear Diophantine equations, modular arithmetic,
number theoretic functions, Fermat’s last theorem, quadratic residues,
primitive roots, Chinese Remainder theorem. Prerequisites: Calculus II or
permission of the MED director.
Restrictions: Enrollment is limited to Graduate level students.

MED 553 Discrete Structures (3 credits)
An introduction to the basic concepts of discrete mathematics essential
both to mathematics and many of its applications. Topics include logic,
sets, relations, functions, recurrence equations, combinatorics, graphs.
Techniques of mathematical proof will be developed. Prerequisites:
Calculus II or permission of the MED director.
Restrictions: Enrollment is limited to Graduate level students.

MED 554 Geometry (3 credits)
Contemporary topics in Euclidean and non-Euclidean geometry.
Topics include motion geometry, affine transformation, projective
transformations, axiomatic systems, and applications of geometry.
Prerequisites: MED 552 or MED 553 or permission of the MED director.
Prerequisites: MED 553 or MED 4035
Restrictions: Enrollment is limited to Graduate level students.

MED 555 Probability & Statistics (3 credits)
Descriptive statistics, random variables, discrete and continuous
probability distributions, moments, correlations, sampling distributions,
estimation, confidence intervals, hypothesis testing, linear regression and
analysis of variance. Additional topics as time permits may include factor
analysis, contingency tables, multilinear regression and nonparametric
methods. Prerequisites: Calculus II or permission of the MED director.
Restrictions: Enrollment is limited to Graduate level students.

MED 556 Linear Algebra (3 credits)
Linear systems, vector spaces, dimension, linear transformations,
matrices, inner product, orthogonality, characteristic polynomials,
diagonalization, eigenvalues, eigenvectors. Prerequisites: Calculus II or
permission of the MED director.
Restrictions: Enrollment is limited to Graduate level students.

MED 557 Abstract Algebra (3 credits)
This course discusses modern topics in abstract algebra – groups,
rings, ideals, fields, vector spaces. Axiomatic systems are used to
prove theorems and discuss relationships such as homomorphism
and isomorphism. Applications in elementary geometry and algebra
are discussed. Prerequisites: Calculus II; and MED 552 or MED 553 or
permission of the MED director.
Prerequisites: MED 553 or MED 4035
Restrictions: Enrollment is limited to Graduate level students.

MED 559 Mathematical Problem Solving (3 credits)
Techniques of solving mathematical problems which draw on a wide
mathematical background. Solutions may incorporate concepts from
linear algebra, analysis, modern algebra, combinatorics, geometry and
applied mathematics. Prerequisites: Calculus II; and MED 552 or MED 553
or permission of the MED director.
Prerequisites: MED 553 or MED 4035
Restrictions: Enrollment is limited to Graduate level students.

MED 601 Comm & Tech in Mathematics (3 credits)
This course is designed to introduce pre-service teachers to the different
types of technology available to the mathematics classroom. The
use of manipulative devices, portfolios or journals, writing and verbal
communication in the mathematics classroom will be discussed.
Emphasis will be placed on the appropriate use of the graphing
calculator, applications for the personal computer, and the internet in the
mathematics classroom. Ethical and practical issues surrounding the use
of technology will be discussed.
Restrictions: Enrollment is limited to Graduate level students.

MED 602 Secondary Math Curriculum (3 credits)
This course examines the ways in which high school students acquire
mathematical knowledge, considers the particular mathematical
knowledge they should have at each grade level (as articulated by the
Principles and Standards of School Mathematics), and applies this
understanding to the design of secondary mathematics curricula.
Restrictions: Enrollment is limited to Graduate level students.

MED 603 Assessment in Secondary Math (3 credits)
This course is a practical guide to designing a variety of assessment
tools. Students will learn how to design projects, group activities, writing
activities, portfolios and tests that together can be used to assess what
students know and can do. The role of assessment is twofold: to assess
what students have learned, and to modify our teaching strategies to
enhance student learning. Students will be concerned with the curriculum
of the secondary mathematics program, grades 7-12.
Restrictions: Enrollment is limited to Graduate level students.

MED 604 Adv Perspect on Secondary Math (3 credits)
This course is an in depth study of the mathematics typically learned
in middle and high school mathematics classes. We will identify core
mathematical ideas and then also the common errors that students
make, the misunderstandings they frequently have, and the questions
they ask. We will develop strategies for addressing misconceptions and
compose answers to questions that might arise in the classroom and in
so doing further our own understanding of mathematics. We will situate
the ideas within a broader mathematical context to be sure that we are
generating responses that further students’ mathematical development.
We will use this information to create examples, problems and projects
that would enrich students’ understanding.
Restrictions: Enrollment is limited to Graduate level students.

MED 605 Interdisciplinary Math & Sci Edu (3 credits)
This course explores ways to integrate math and science teaching at
the secondary level. We review the mathematics and science secondary
curricula and identify places where connections can be made and
determine approaches to teach math and science so that concepts
learned in one discipline can be used to reinforce concepts learned in
the other. We consider existing projects that combine mathematics and
science and use what is learned to develop new projects.
Restrictions: Enrollment is limited to Graduate level students.
MED 611 Adv Methods Teaching Geometry (3 credits)
This course discusses specific topics from geometry, their impact on the changing geometry curriculum, their application through technology and their connection to other areas within and outside mathematics. Students will examine recent research trends and practical methods for teaching geometry at the secondary level and explore several methods of geometry curriculum design and instruction. Students will learn what role the processes of visualization, construction and reasoning play in learning and teaching geometry. Classroom materials, activities and techniques are discussed and developed and concepts explained and explored through a variety of modes including manipulatives, interactive computer software and graphing calculators. Prerequisite: MED 554 or permission of the MED director.

MED 612 Math Tchg:Discover Effect Prac (2 credits)

MED 750 Reading & Research in Math Ed (3 credits)

MED 770 Topics in Math Education (1-3 credits)
Topics and issues in secondary mathematics teaching, from theoretical underpinnings to practical applications. Topics will vary depending on interests and backgrounds of students. Permission of the MED director required.
Restrictions: Enrollment is limited to Graduate level students.

MED 771 Topics in Mathematics (1-3 credits)
Topics in mathematics such as advanced abstract algebra, real analysis, combinatorics, graph theory, topology, logic, and dynamical systems. Topics will vary depending on interests and backgrounds of students. Prerequisites: MED 559 or permission of the MED director.
Prerequisites: MED 4095 or MED 559
Restrictions: Enrollment is limited to Graduate level students.

MED 783 Research in Mathematics I (3 credits)

MED 784 Research in Mathematics II (3 credits)
Students will design and carry out a research project in mathematics as an independent study, working closely with a faculty mentor. Permission and approval by the mentor and MED director are required.
Restrictions: Enrollment is limited to Graduate level students.

MED 793 Research in Math Education I (3 credits)

MED 794 Research in Math Education II (1-3 credits)
Students will design and carry out a research project in mathematics education as an independent study, working closely with a faculty mentor. Permission and approval by the mentor and MED director are required.
Restrictions: Enrollment is limited to Graduate level students.

MED 795 Master's Thesis (3 credits)

MED 796 Master's Thesis (3 credits)