

M.Ed. – Curriculum & Instruction

Emphasis in Mathematics

The major in Curriculum and Instruction is designed to prepare master teachers and graduates with instructional leadership skills. It has three major objectives:

- to provide knowledge, skills, attitudes, and applicable research skills in curriculum and pedagogy;
- to develop master teachers to serve as teacher educators, mentors, clinical teaching faculty, and peer coaches;
- to provide experience in educational research related to effective educational practice in field-settings.

The major in Curriculum and Instruction is designed to serve the many educators who desire a program with an emphasis on instructional leadership and effective teaching. This major is responsive to the needs of the South Texas educational community and to state and national priorities for restructuring and delivering teacher education programs. A comprehensive examination is required. Students choosing the thesis option will take EDCI 7300 and 7301 in lieu of six hours of electives. For course descriptions and other information related to graduate studies visit our website at <http://utb.edu/vpaa/graduate>.

Admission Requirements

Evidence of academic achievement and potential for advanced study and research is required for graduate admission. Specific criteria for Unconditional Admission for Master's degree seeking students in Curriculum and Instruction are:

- Undergraduate GPA of 3.0
- GRE Verbal score of 450
- GRE Quantitative score of 450
- GRE Analytical score of 4.0

Applicants with an undergraduate GPA of at least 2.5 and/or GRE scores lower than those specified are also encouraged to apply.

Notification of decisions on graduate admission is made by the office of Graduate Studies based on the admission criteria and recommendation of the academic department. Information related to application procedures and deadlines is available at the Office of Graduate Studies.

Careers

- K-12 teacher
- ISD Curriculum Specialist
- ISD Staff Development
- Consulting and Training
- Regional Educational Service Center Staff
- Texas Education Association Staff



36-Hour Thesis/Non-thesis Program

Required Courses: 36 hours

The options are designed for mathematics teachers who desire to improve their knowledge of pedagogy and content. The program is designed to emphasize instructional leadership and effective teaching in mathematics and has been approved by some area school districts for additional stipends.

Elementary Option

EDCI Core Curriculum (9 hrs)

EDCI 6300	Introduction to Research
EDCI 6304	Learning and Cognition
EDCI 6334	Curriculum Development

EDCI Prescribed Electives (6 hrs)

EDCI 6330	Curriculum in the Elementary School
EDCI 6302	Field Research Methodology

Mathematics Education Core (9 hrs)

EDCI 6341	Teaching Algebraic Concepts
EDCI 6343	Teaching Geometric Concepts
EDCI 6349	Current Issues and Research in Mathematics Education

Mathematics Content (15 hrs)

MATH 5331	Higher Geometry
MATH 5361	Mathematical Modeling
MATH 5304	Foundations of Mathematics
MATH 5321	Higher Algebra
MATH 5341	Higher Analysis

Secondary Option

EDCI Core Curriculum (9 hrs)

EDCI 6300	Introduction to Research
EDCI 6304	Learning and Cognition
EDCI 6334	Curriculum Development

EDCI Prescribed Elective (3 hrs)

EDCI 6331	Curriculum in the Secondary School
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Mathematics Education Core (9 hrs)

EDCI 6341	Teaching Algebraic Concepts
EDCI 6343	Teaching Geometric Concepts
EDCI 6349	Current Issues and Research in Mathematics Education

Specialization (15 hrs)

Required Graduate Mathematics Courses (9hrs)

MATH 5321	Higher Algebra
MATH 5331	Higher Geometry
MATH 6341	Higher Analysis
Graduate Mathematics Elective (6 hrs)	
MATH 5304	Foundations of Mathematics
MATH 5329	Number Theory
MATH 5309	Integrating Technology into Mathematics
MATH 5381	Mathematical Statistics
MATH 5361	Mathematical Modeling

Advisor

Dr. James Telese • EDBC 2.326 • 882-7669 • james.telese@utb.edu

Course Descriptions

Elementary Option

EDCI 6300 Introduction to Research

Introduction to research techniques; identification of problems, research designs and data gathering procedures. The planning and design of research proposals and projects are emphasized. The course must be completed or in progress before the student applies for the oral interview. Lec 3, Cr 3

EDCI 6330 The Curriculum in the Elementary School

This course focuses on the theory and factors that shape the elementary school curriculum. The course will also examine the organization and content of curriculum subjects and the trends, issues and new developments in the field. Lec 3, Cr 3

EDCI 6334 Curriculum Development - Problems and Processes

This course examines approaches in developing, implementing, and evaluating elementary and secondary school curricula. Principles and practices in the use and production of curriculum frameworks, guides, textbooks and other curriculum materials will be included. Lec 3, Cr 3

EDCI 6304 Learning and Cognition

This critical course focuses on topics, theories, and models of cognitive research and their implications for instructional practice and curriculum restructuring and design. This is a field-based course. Lec 3, Cr 3

EDCI 6302 Field-Research Methodology

This course is an introduction to field-based research methodologies with an emphasis on the teacher as a researcher and on reflective teaching and teaching as decision-making. This is a field-based course. Lec 3, Cr 3

EDCI 6341 Teaching and Learning Algebraic Concepts

This course covers learning theories related to school algebra, as well as strategies for teaching algebraic concepts. Topics include best practices based on research, and development of materials that support the learning of foundational algebraic concepts. Students will utilize technology and other "tools". *Prerequisite: May be taken by post-baccalaureate or graduate student in education. Lec 3, Cr 3*

EDCI 6343 Teaching and Learning Geometric Concepts

This course covers learning theories related to learning geometry, as well as strategies for teaching geometric concepts. Topics include best practices based on research, and the development of materials that support the learning of geometric concepts through the use of technology and other "tools". *Prerequisite: May be taken by post-baccalaureate or graduate students in education. Lec 3, Cr 3*

EDCI 6349 Current Issues and Research in Mathematics Education

Current Issues will include studies of prominent issues and problems related to mathematics education and curriculum development. Topics include multicultural mathematics education, gender and ethnicity issues regarding mathematics, analysis of learning in the mathematics classroom, using the Internet to enrich the teaching of Math and review of recent research in mathematics education. Lec 3, Cr 3

MATH 5331 Higher Geometry

This course is on projective, Euclidean or convex geometry. Projective geometry includes basic incidence geometry, group actions on geometries, ternary rings and coordinates in projective and affine geometries, and the fundamental theorem of projective geometry. *Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3*

MATH 5361 Mathematical Modeling

The contents of this course are widely open. It may include modeling with difference and differential equations, and stochastic processes. The course may be project-oriented. *Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3*

MATH 5304 Foundations of Mathematics

This course studies elements of mathematical logic, set theory, number theory and selected topics from discrete mathematics like combinatorial analysis and graph theory. Mathematical proofs are emphasized.

Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3

MATH 5321 Higher Algebra

The purpose of this course is to provide the necessary algebraic background for all branches of modern mathematics that use algebraic language and methods. Topics include basic ring theory (polynomial rings over fields (perhaps Nullstellensatz), unique factorization domains, Dedekind rings), field extensions, and basic Galois theory with the usual applications to classical problems in geometry. *Prerequisite: 6*

semester hours of 4000-level math. Lec 3, Cr 3

MATH 5341 Higher Analysis

This course presents the system of the real numbers and the system of the complex numbers, sequences and series of real numbers, continuity and differentiability of real functions, the Riemann-Stieltjes integral, convergence of sequences and series of functions, and aspects of functions in several variables and topology.

Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3

Secondary Option

EDCI 6300 Introduction to Research

Introduction to research techniques; identification of problems, research designs and data gathering procedures. The planning and design of research proposals and projects are emphasized. The course must be completed or in progress before the student applies for the oral interview. Lec 3, Cr 3

EDCI 6331 The Curriculum in the Secondary School

This course examines the theory and the background of the curriculum in the senior high and middle schools in the U.S. It includes an examination of curriculum in the disciplines and curriculum organization and an analysis of trends, issues, and innovations in the field. Lec 3, Cr 3

EDCI 6334 Curriculum Development - Problems and Processes

This course examines approaches in developing, implementing, and evaluating elementary and secondary school curricula. Principles and practices in the use and production of curriculum frameworks, guides, textbooks and other curriculum materials will be included. *Prerequisite: EDCI 6330, 6331 or equivalent. Lec 3, Cr 3*

EDCI 6304 Learning and Cognition

This critical course focuses on topics, theories, and models of cognitive research and their implications for instructional practice and curriculum restructuring and design. This is a field-based course. Lec 3, Cr 3

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EDCI 6343 Teaching and Learning Geometric Concepts

This course covers learning theories related to learning geometry, as well as strategies for teaching geometric concepts. Topics include best practices based on research, and the development of materials that support the learning of geometric concepts through the use of technology and other "tools". *Prerequisite: May be taken by post-baccalaureate or graduate students in education. Lec 3, Cr 3*

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This course studies elements of mathematical logic, set theory, number theory and selected topics from discrete mathematics like combinatorial analysis and

graph theory. Mathematical proofs are emphasized. *Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3*

MATH 5329 Number Theory

This course is an introduction to number theory, one of the major branches of modern mathematics. Topics include arithmetic functions (Moebius, Euler, Dirichlet), Dirichlet series (convergence, uniqueness, multiplicative property) distribution of primes (Dirichlet, Tchebycheff, Hadamard resp. de la Vallee Poussin), Riemann's zeta function. *Prerequisite: MATH 5321 or consent of the instructor Lec 3, Cr. 3*

MATH 5309 Integrating Technology to Mathematics

This is an introductory course related to the latest technological computer programs, especially in mathematics. It covers some of the following educational computer softwares: graphing calculator, dynamic geometry, computer algebra systems, publishing softwares and some multimedia and internet related softwares. *Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3 MATH*

MATH 5381 Mathematical Statistics

This is a course in inferential statistics. Topics covered include random sampling, distribution of means and the central limit theorem, estimation problems, tests of hypotheses, linear regression, correlation, and analysis of variance.

Prerequisite: MATH 4374 or consent of instructor Lec 3, Cr 3

MATH 5361 Mathematical Modeling

The contents of this course are widely open. It may include modeling with difference and differential equations, and stochastic processes. The course may be project-oriented. *Prerequisite: 6 semester hours of 4000-level math. Lec 3, Cr 3*