

DEPARTMENT OF MATHEMATICS

Mission Statement

The Department of Mathematics is dedicated to research, high-quality instruction and learning, community engagement and public service. The department embraces excellence, multicultural traditions, with the mission to empower its undergraduate and graduate students, especially those from backgrounds underrepresented in the mathematical sciences.

General Information

The Department serves as the point of articulation for disciplines across science, technology, and engineering represented in the College of Sciences at UTSA and beyond. The Department is a center for intellectual and creative resources via its diverse group of faculty with the mission to contribute at all levels to socioeconomic development—for Texas, the nation, and the world.

Degrees

The Department of Mathematics offers three Bachelor of Science degrees: the B.S. in Mathematics, the B.S. in Mathematics for Teaching, and the B.S. in Mathematics of Data and Computing, offered as a joint degree with the Department of Computer Science.

The Mathematics programs offers students the opportunity to prepare to provide technical support and conduct research for high-technology industries, government, and private companies. The Mathematics for Teaching degree includes a component for those students wishing to obtain state certification to teach mathematics at the secondary level. The Mathematics of Data and Computing degree prepares students with strong interests in both mathematics and computer science to work in areas involving data science, data analysis, or computational mathematics. All three degrees prepare students to pursue advanced graduate study. The department also offers a Minor in Mathematics. Students interested in electives in Statistics, a Minor in Applied Statistics, or a Bachelor of Science degree in Statistics, should refer to the Department of Management Science and Statistics in the College of Business section of this catalog.

Educational Objectives

Upon graduation, students in the Department of Mathematics programs will be able to:

- Exhibit a knowledge of mathematical concepts, methods, reasoning and language.
- Communicate mathematical concepts and procedures with clarity and precision.
- Use computational techniques to analyze and synthesize numerical data.
- Solve problems in computational and theoretical mathematics.
- Use mathematical techniques to model real-world processes.

- B.S. Degree in Mathematics (p. 1)
- B.S. Degree in Mathematics for Teaching (p. 3)
- B.S. Degree in Mathematics of Data and Computing (p. 5)

Bachelor of Science Degree in Mathematics

The Bachelor of Science (B.S.) Degree in Mathematics offers students the opportunity to prepare to provide technical support and conduct research for high-technology industries, government, and private companies. The minimum number of semester credit hours required for this degree, including the Core Curriculum requirements, is 120. Thirty-nine of the total semester credit hours required for the degree must be at the upper-division level. All required and elective mathematics, computer science, and statistics courses must be completed with a grade of “C-” or better.

All candidates for this degree must fulfill the Core Curriculum requirements and the mathematics requirements, which are listed in the following pages. In addition, a candidate for the Bachelor of Science degree in Mathematics must complete the course requirements for the concentration declared by the candidate.

Core Curriculum Requirements (42 semester credit hours)

Students seeking the B.S. degree in Mathematics must fulfill University Core Curriculum requirements. If courses are taken to satisfy both degree requirements and Core Curriculum requirements, then students may need to take additional courses in order to meet the minimum number of semester credit hours required for this degree.

MAT 1214 may be used to satisfy the core requirement in Mathematics as well as a major requirement.

Core Curriculum Component Area Requirements (<http://catalog.utsa.edu/undergraduate/bachelorsdegreeregulations/degreerequirements/corecurriculumcomponentarearequirements/>)

First Year Experience Requirement	3
Communication	6
Mathematics	3
Life and Physical Sciences	6
Language, Philosophy and Culture	3
Creative Arts	3
American History	6
Government-Political Science	6
Social and Behavioral Sciences	3
Component Area Option	3
Total Credit Hours	42

Gateway Courses

Students pursuing the B.S. degree in Mathematics must successfully complete each of the following Gateway Courses with a grade of “C-” or better in no more than two attempts. A student who is unable to successfully complete these courses within two attempts, including dropping a course with a grade of “W” or taking an equivalent course at another institution, will be required to change his or her major.

Code	Title	Credit Hours
MAT 1214	Calculus I	
MAT 1224	Calculus II	

Mathematics Degree Requirements

Code	Title	Credit Hours
A. Required Mathematics courses		
MAT 1214	Calculus I (The student who is not prepared to begin MAT 1214 must take MAT 1093 Precalculus.)	4
MAT 1224	Calculus II	4
MAT 1313	Algebra and Number Systems	3
MAT 2214	Calculus III	4
MAT 2233	Linear Algebra	3
MAT 3013	Foundations of Mathematics	3
MAT 3213	Foundations of Analysis	3
MAT 4213	Real Analysis I	3
B. Computer Science courses		
Select one of the following:		3-4
CS 1063	Introduction to Computer Programming I	
CS 1714	Computer Programming II	
CS 2073	Computer Programming with Engineering Applications	
C. Required Mathematics/Statistics courses		
MAT 3613	Differential Equations I	3
MAT 3633	Numerical Analysis	3
MAT 4223	Real Analysis II	3
MAT 4233	Modern Abstract Algebra	3
MAT 4273	Topology	3
STA 3003	Applied Statistics	3
STA 3513	Probability and Statistics	3
D. Upper-division courses in mathematics or statistics		
Select 9 semester credits of upper-division courses in mathematics or statistics approved by the student's advisor		9
E. Electives		
Select 20 or 21 semester credit hours of electives		20-21
Total Credit Hours		81

Course Sequence Guide for B.S. Degree in Mathematics

This course sequence guide is designed to assist students in completing their UTSA undergraduate Mathematics degree requirements. *This is merely a guide and students must satisfy other requirements of this catalog and meet with their academic advisor for individualized degree plans.* Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.

B.S. in Mathematics – Recommended Four-Year Academic Plan

First Year		Credit Hours
Fall		
AIS 1203	Academic Inquiry and Scholarship (core)	3
MAT 1214	Calculus I (core and major)	4
MAT 1313	Algebra and Number Systems	3
WRC 1013	Freshman Composition I (core)	3

American History (core)		3
Credit Hours		16
Spring		
MAT 1224	Calculus II	4
WRC 1023	Freshman Composition II (core)	3
Life & Physical Sciences (core)		3
Select one of the following:		3-4
CS 1063	Introduction to Computer Programming I	
CS 1714	Computer Programming II	
CS 2073	Computer Programming with Engineering Applications	
Credit Hours		13-14
Second Year		
Fall		
MAT 2214	Calculus III	4
MAT 2233	Linear Algebra	3
Government-Political Science (core)		3
Life and Physical Sciences (core)		3
Free elective		3
Credit Hours		16
Spring		
MAT 3013	Foundations of Mathematics	3
STA 3003	Applied Statistics	3
Creative Arts (core)		3
Government-Political Science (core)		3
Free elective		3
Credit Hours		15
Third Year		
Fall		
MAT 3613	Differential Equations I	3
STA 3513	Probability and Statistics	3
Social & Behavioral Sciences (core)		3
Upper-division MAT or STA elective		3
Free elective		3
Credit Hours		15
Spring		
MAT 3213	Foundations of Analysis	3
MAT 4233	Modern Abstract Algebra	3
Component Area Option (core)		3
Free elective		3
Upper-division MAT or STA elective		3
Credit Hours		15
Fourth Year		
Fall		
MAT 3633	Numerical Analysis	3
MAT 4213	Real Analysis I	3
MAT 4273	Topology	3
Free elective		3
Upper-division Free elective		3
Credit Hours		15

Spring

MAT 4223	Real Analysis II	3
Free elective ¹		2-3
Upper-division MAT or STA elective		3
American History (core)		3
Language Philosophy & Culture (core)		3
Credit Hours		15-14
Total Credit Hours		120

¹ Only 2 semester credit hours are needed if CS 1714 is taken.

Note: Some courses are only offered once a year: Fall or Spring. Check with the Department of Mathematics for scheduling of courses.

Bachelor of Science Degree in Mathematics for Teaching

The Bachelor of Science (B.S.) degree in Mathematics for Teaching is designed for at the secondary or middle grades level as a certified mathematics teacher. This program integrates a specialized set of mathematics courses with courses from the B.S. in Mathematics, as well as the UTeachSA program, so that students can gain solid foundations in the mathematics and education fields to obtain the 7-12 Mathematics Teaching Certification.

The minimum number of semester credit hours required for this degree, including the Core Curriculum requirements, is 120. Thirty-nine of the total semester credit hours required for the degree must be at the upper-division level.

Requirements for students pursuing teacher certification are different from degree requirements. In addition to specific course requirements, teacher certification in Texas also requires passing scores on the Texas Success Initiative approved assessment instrument test and acceptable scores on the state-mandated exit competency test. Complete information may be obtained in the Teacher Certification Center at UTSA.

All majors in mathematics are required to complete all required and elective mathematics, computer science, and statistics courses with a grade of "C-" or better.

All candidates for this degree must fulfill the Core Curriculum requirements and the degree requirements, which are listed below.

Criminal Background Check

Teacher preparation programs at UTSA requires fieldwork in public schools. This requires that a student be able to pass a criminal background check conducted by the school districts. It is the responsibility of the student to determine if their criminal history background will present a problem before applying for admission to the teacher preparation program. Students with a problematic criminal history will encounter difficulty in completing any fieldwork requirements and may not be able to complete the program.

Core Curriculum Requirements (42 semester credit hours)

Students seeking the B.S. degree in Mathematics for Teaching must fulfill University Core Curriculum requirements. If courses are taken to satisfy both degree requirements and Core Curriculum requirements,

then students may need to take additional courses in order to meet the minimum number of semester credit hours required for this degree.

MAT 1214 may be used to satisfy the core requirement in Mathematics as well as a major requirement.

Core Curriculum Component Area Requirements (<http://catalog.utsa.edu/undergraduate/bachelorsdegreeregulations/degerequirements/corecurriculumcomponentarearequirements/>)

First Year Experience Requirement	3
Communication	6
Mathematics	3
Life and Physical Sciences	6
Language, Philosophy and Culture	3
Creative Arts	3
American History	6
Government-Political Science	6
Social and Behavioral Sciences	3
Component Area Option	3
Total Credit Hours	42

Gateway Courses

Students pursuing the B.S. degree in Mathematics for Teaching must successfully complete each of the following Gateway Courses with a grade of "C-" or better in no more than two attempts. A student who is unable to successfully complete these courses within two attempts, including dropping a course with a grade of "W" or taking an equivalent course at another institution, will be required to change his or her major.

Code	Title	Credit Hours
MAT 1214	Calculus I	
MAT 1224	Calculus II	

Mathematics for Teaching Degree Requirements

Code	Title	Credit Hours
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A. Required Mathematics courses

MAT 1214	Calculus I (Students not prepared to take MAT 1214 must take MAT 1093 Precalculus.)	4
MAT 1224	Calculus II	4
MAT 1313	Algebra and Number Systems	3
MAT 2214	Calculus III	4
MAT 2233	Linear Algebra	3
MAT 2313	Combinatorics and Probability	3
MAT 3013	Foundations of Mathematics	3

B. Specialized Mathematics Courses

21 semester credit hours of specialized mathematics courses		
MAT 2113	Functions and Modeling	3
MAT 3103	Data Analysis and Interpretation	3
MAT 3123	Fundamentals of Geometry	3
MAT 3213	Foundations of Analysis	3
MAT 3233	Modern Algebra	3
MAT 4113	Computer Mathematical Topics	3
MAT 4303	Capstone Course for Mathematics	3

C. Electives

6 semester credit hours of upper division coursework approved by the Undergraduate Advisor of Record 6

D. Education Courses

30 semester credit hours of UTeachSA and education courses

UTE 1111	Introduction to STEM Teaching Step 1	1
UTE 1122	Introduction to STEM Teaching Step 2	2
UTE 3023	Perspectives on Science and Mathematics	3
UTE 3203	Knowing and Learning in Mathematics and Science	3
UTE 3213	Classroom Interactions	3
UTE 4203	Project-Based Instruction	3
ESL 3083	Second Language Teaching and Learning for Grades 7-12	3
LTED 3773	Reading and Writing Across the Disciplines-Grades 7-12	3
SPE 3603	Introduction to Special Education	3
UTE 4646	Clinical Teaching	6
Total Credit Hours		81

Requirements for students pursuing teacher certification are different from degree requirements. In addition to specific course requirements, teacher certification in Texas also requires passing scores on a Texas Success Initiative approved assessment instrument test and acceptable scores on the state-mandated exit competency test. Complete information may be obtained in the Teacher Certification Center at UTSA.

Course Sequence Guide for B.S. Degree in Mathematics for Teaching

This course sequence guide is designed to assist students in completing their UTSA undergraduate Mathematics for Teaching degree requirements. *This is merely a guide and students must satisfy other requirements of this catalog and meet with their academic advisor for individualized degree plans.* Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.

B.S. in Mathematics for Teaching – Recommended Four-Year Academic Plan

First Year

		Credit Hours
Fall		
AIS 1203	Academic Inquiry and Scholarship (core)	3
MAT 1214	Calculus I (core and major)	4
MAT 1313	Algebra and Number Systems	3
UTE 1111	Introduction to STEM Teaching Step 1	1
WRC 1013	Freshman Composition I (core)	3
Credit Hours		14

Spring

MAT 1224	Calculus II	4
UTE 1122	Introduction to STEM Teaching Step 2	2
WRC 1023	Freshman Composition II (core)	3
Life & Physical Sciences (core)		3

Language, Philosophy & Culture (core)	3
Credit Hours	15

Summer

American History (core)	3
Component Area Option (core)	3
Social & Behavioral Sciences (core)	3
Credit Hours	9

Second Year

Fall

MAT 2214	Calculus III	4
MAT 3013	Foundations of Mathematics	3
UTE 3203	Knowing and Learning in Mathematics and Science	3
Creative Arts (core)		3
Government-Political Science (core)		3
Credit Hours		16

Spring

MAT 2233	Linear Algebra	3
MAT 3103	Data Analysis and Interpretation	3
UTE 2113	Functions and Modeling	3
UTE 3213	Classroom Interactions	3
Life & Physical Sciences (core)		3
Credit Hours		15

Summer

MAT 4113	Computer Mathematical Topics	3
Government-Political Science (core)		3
Credit Hours		6

Third Year

Fall

MAT 3123	Fundamentals of Geometry	3
MAT 2313	Combinatorics and Probability	3
UTE 3023	Perspectives on Science and Mathematics	3
American History (core)		3
Credit Hours		12

Spring

ESL 3083	Second Language Teaching and Learning for Grades 7-12	3
MAT 3213	Foundations of Analysis	3
MAT 3233	Modern Algebra	3
SPE 3603	Introduction to Special Education	3
Approved upper-division elective		3
Credit Hours		15

Fourth Year

Fall

MAT 4303	Capstone Course for Mathematics	3
LTED 3773	Reading and Writing Across the Disciplines-Grades 7-12	3
UTE 4203	Project-Based Instruction	3
Approved upper-division elective		3
Credit Hours		12

Spring

CI 4616	Clinical Teaching: Early Childhood–Grade 6	6
Credit Hours		6
Total Credit Hours		120

Note: Some courses are only offered once a year: Fall or Spring. Check with the Department of Mathematics for scheduling of courses.

Bachelor of Science Degree in Mathematics of Data and Computing

The Bachelor of Science (B.S.) degree in Mathematics of Data and Computing is offered as a joint program with the Department of Computer Science. The Mathematics of Data and Computing degree prepares students with strong interests in both mathematics and computer science to work in areas involving data science, data analysis, or computational mathematics.

The minimum number of semester credit hours required for this degree, including the Core Curriculum requirements, is 120. Thirty-nine of the total semester credit hours required for the degree must be at the upper-division level.

All required and elective mathematics, computer science, and statistics courses must be completed with a grade of "C-" or better.

All candidates for this degree must fulfill the Core Curriculum requirements, the computer science requirements, and the mathematics requirements.

Core Curriculum Requirements (42 semester credit hours)

Students seeking the B.S. degree in Mathematics of Data and Computing must fulfill University Core Curriculum requirements. If courses are taken to satisfy both degree requirements and the Core Curriculum requirements, then students may need to take additional courses in order to meet the minimum number of semester credit hours required for this degree.

MAT 1214 may be used to satisfy the core requirement in mathematics as well as a major requirement.

Core Curriculum Component Area Requirements (<http://catalog.utsa.edu/undergraduate/bachelorsdegreeregulations/degreerequirements/corecurriculumcomponentarearequirements/>)

First Year Experience Requirement	3
Communication	6
Mathematics	3
Life and Physical Sciences	6
Language, Philosophy and Culture	3
Creative Arts	3
American History	6
Government-Political Science	6
Social and Behavioral Sciences	3
Component Area Option	3
Total Credit Hours	42

Gateway Courses

Students pursuing the B.S. degree in Mathematics of Data and Computing must successfully complete each of the following Gateway Courses with a grade of "C-" or better in no more than two attempts. A student who is unable to successfully complete these courses within two attempts, including dropping a course with a grade of "W" or taking an equivalent course at another institution, will be required to change his or her major.

Code	Title	Credit Hours
CS 1714	Computer Programming II	
CS 2124	Data Structures	
MAT 1214	Calculus I	
MAT 1224	Calculus II	

Mathematics of Data and Computing Degree Requirements

All candidates for the B.S. degree in Mathematics of Data and Computing must complete the following 28 semester credit hours of required courses in computer science, 29 hours of required courses in mathematics (this includes the 3 semester credit hours of the Core Curriculum requirement in mathematics), and 18 hours of upper-division computer science or mathematics coursework.

Code	Title	Credit Hours
A. Computer Science courses		
CS 1011	Essence of Computer Science	1
CS 1083	Programming I for Computer Scientists	3
CS 1714	Computer Programming II	4
CS 2124	Data Structures	4
CS 3343	Analysis of Algorithms	3
CS 3424	Systems Programming	4
CS 3443	Application Programming	3
CS 3743	Database Systems	3
CS 3843	Computer Organization	3
B. Mathematics courses		
MAT 1313	Algebra and Number Systems	3
MAT 1214	Calculus I	4
MAT 1224	Calculus II	4
MAT 2233	Linear Algebra	3
MAT 2313	Combinatorics and Probability	3
MAT 3013	Foundations of Mathematics	3
MAT 3233	Modern Algebra	3
MAT 3313	Logic and Computability	3
MAT 4353	Mathematical Foundations of Cryptography	3
C. Upper Division Computer Science/Mathematics Electives		
Students must complete 18 hours of upper-division computer science or mathematics electives as approved by the Undergraduate Advisor of Record in either the Computer Science or Mathematics Department.		18
D. Free Electives		
Select 6 semester credit hours of electives		6
Total Credit Hours		81

Course Sequence Guide for B.S. Degree in Mathematics of Data and Computing

This course sequence guide is designed to assist students in completing their UTSA undergraduate Mathematics of Data and Computing degree requirements. *This is merely a guide and students must satisfy other requirements of this catalog and meet with their academic advisor for individualized degree plans.* Progress within this guide depends upon such factors as course availability, individual student academic preparation, student time management, work obligations, and individual financial considerations. Students may choose to take courses during Summer terms to reduce course loads during long semesters.

B.S. in Mathematics of Data and Computing – Recommended Four-Year Academic Plan

First Year

Fall		Credit Hours
AIS 1203	Academic Inquiry and Scholarship (core)	3
MAT 1214	Calculus I (core)	4
MAT 1313	Algebra and Number Systems	3
WRC 1013	Freshman Composition I (core)	3
CS 1083	Programming I for Computer Scientists	3
CS 1011	Essence of Computer Science	1
Credit Hours		17

Spring

MAT 1224	Calculus II	4
WRC 1023	Freshman Composition II (core)	3
CS 1714	Computer Programming II	4
Life and Physical Sciences (core)		3
Credit Hours		14

Second Year

Fall		Credit Hours
Language, Philosophy, and Culture (core)		3
MAT 2233	Linear Algebra	3
MAT 2313	Combinatorics and Probability	3
CS 2124	Data Structures	4
Life and Physical Sciences (core)		3
Credit Hours		16

Spring

MAT 3013	Foundations of Mathematics	3
CS 3343	Analysis of Algorithms	3
CS 3424	Systems Programming	4
Government-Political Science (core)		3
American History (core)		3
Credit Hours		16

Third Year

Fall		Credit Hours
MAT 3233	Modern Algebra	3
CS 3443	Application Programming	3
CS 3743	Database Systems	3
Government-Political Science (core)		3
Approved upper-division CS/MAT elective		3
Credit Hours		15

Spring

MAT 3313	Logic and Computability	3
CS 3843	Computer Organization	3
Creative Arts (core)		3
Approved upper-division CS/MAT elective		3
Component area option (core)		3
Credit Hours		15

Fourth Year

Fall

Approved upper-division CS/MAT elective		3
Approved upper-division CS/MAT elective		3
Free Elective		3
American History (core)		3
Social and Behavioral Science (core)		3
Credit Hours		15

Spring

MAT 4353	Mathematical Foundations of Cryptography	3
Approved upper-division CS/MAT elective		3
Approved upper-division CS/MAT elective		3
Free Elective		3
Credit Hours		12
Total Credit Hours		120

Minor in Mathematics

All students pursuing the Minor in Mathematics must complete 23 semester credit hours. All required and elective mathematics, computer science, and statistics courses must be completed with a grade of "C-" or better.

Code	Title	Credit Hours
A. Required courses		
MAT 1214	Calculus I	4
MAT 1224	Calculus II	4
MAT 2214 or CS 3333	Calculus III ¹ Mathematical Foundations of Computer Science	3-4
MAT 2233	Linear Algebra	3
MAT 3613	Differential Equations I ²	3
B. Approved upper-division mathematics electives		
Select a minimum of 6 semester credit hours of approved upper-division mathematics electives		6
Total Credit Hours		23-24

- ¹ For Computer Science majors, substitute CS 3333 Mathematical Foundations of Computer Science.
- ² Computer Science majors may substitute 3 hours of an approved upper-division mathematics elective.

To declare a Minor in Mathematics, obtain advice, or seek approval of substitutions for course requirements, students should consult their academic advisor and the Undergraduate Advisor of Record for the Department of Mathematics.

Mathematics (MAT) Courses

MAT 1023. College Algebra with Applications. (3-0) 3 Credit Hours.

Prerequisite: Satisfactory performance on a placement examination; students pursuing majors in the College of Science or in Engineering should not enroll in this course; students majoring in areas that require MAT 1214 Calculus I are encouraged to take MAT 1073 instead of MAT 1023. Topics include algebraic expressions; equations; inequalities over the real numbers; relations, functions, and graphs; polynomial and rational functions; systems of linear equations and inequalities; complex numbers; and matrices and determinants. A wide range of applications will be included in this course. (Formerly MTC 1023 and MAT 1063. Credit can be earned for only one of the following: MAT 1023, MTC 1023, MAT 1063, or MAT 1073 (formerly MTC 1073). NOTE: For the purpose of the Three-Attempt Rule, these courses are considered to be equivalent, and additional fees may be charged for the third or subsequent attempt to take any of these courses in any combination.) May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: LRC1 \$12; LRS1 \$46.20; STSI \$21.60; DL01 \$75.

MAT 1043. Introduction to Mathematics. (3-0) 3 Credit Hours. (TCCN = MATH 1332)

Prerequisite: Satisfactory performance on a placement examination; this course is designed primarily for the liberal arts major to satisfy the Core Curriculum Mathematics requirement. Topics may include logic; proofs; deductive and inductive reasoning; number theory; fundamentals of statistics; basic statistical graphs; causal connections; financial management; functions; linear graphs and modeling; exponential growth and decay; logarithms; fundamentals of probability; fundamentals of geometry; and basic ideas from trigonometry, calculus, and discrete mathematics. (Formerly MTC 1043. Credit cannot be earned for both MAT 1043 and MTC 1043.) May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: LRC1 \$12; LRS1 \$45; STSI \$21; DL01 \$75.

MAT 1053. Mathematics for Business. (3-0) 3 Credit Hours. (TCCN = MATH 1324)

Prerequisite: Satisfactory performance on a placement examination. This course is designed to prepare the student for MAT 1133 Calculus for Business. Topics include the application of common algebraic functions, including polynomial, exponential, logarithmic, and rational, to problems in business, economics, statistics, finance, and accounting. The applications include mathematics of finance, including simple and compound interest and annuities; systems of linear equations; matrices; linear programming; and probability, including expected value. May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: LRC1 \$12; LRS1 \$46.20; STSI \$21.60; DL01 \$75.

MAT 1073. Algebra for Scientists and Engineers. (1-4) 3 Credit Hours. (TCCN = MATH 1314)

Prerequisite: Satisfactory performance on a placement examination. This course is designed to prepare the student for MAT 1093 Precalculus and MAT 1214 Calculus I. Topics may include algebraic expressions; equations; inequalities over the real numbers; relations; functions; polynomial and rational functions; logarithmic and exponential functions; systems of linear equations and inequalities; matrices and determinants; complex numbers; sequences; series binomial expansion; mathematical induction; permutations, and combinations. (Formerly MTC 1073. Credit can be earned for only one of the following: MAT 1073, MTC 1073, MAT 1023 (formerly MAT 1063 and MTC 1023). NOTE: For the purpose of the Three-Attempt Rule, these courses are considered to be equivalent and additional fees may be charged for the third or subsequent attempt to take any of these courses in any combination.) May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: LRC1 \$12; LRS1 \$46.20; STSI \$21.60; DL01 \$75.

MAT 1093. Precalculus. (3-0) 3 Credit Hours. (TCCN = MATH 2312)

Prerequisite: MAT 1023, MAT 1053, or MAT 1073, or satisfactory performance on a placement examination. Exponential functions, logarithmic functions, trigonometric functions, complex numbers, DeMoivre's theorem, and polar coordinates. May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: DL01 \$75; LRC1 \$12; LRS1 \$46.20; STSI \$21.60.

MAT 1133. Calculus for Business. (3-0) 3 Credit Hours. (TCCN = MATH 1325)

Prerequisite: MAT 1023, MAT 1053, or MAT 1073 (with a grade of "C" or better), or satisfactory performance on a placement examination. This course is the basic study of limits and continuity, differentiation of single and multivariable functions, optimization and graphing, and integration of elementary, single variable functions, with an emphasis on applications in business and economics. May apply toward the Core Curriculum requirement in Mathematics. (Formerly MAT 1033. Credit cannot be earned for both MAT 1033 and MAT 1133.) Generally offered: Fall, Spring, Summer. Course Fees: DL01 \$75; LRC1 \$12; LRS1 \$46.20; STSI \$21.60.

MAT 1153. Essential Elements in Mathematics I. (3-0) 3 Credit Hours. (TCCN = MATH 1350)

Prerequisite: MAT 1023 or MAT 1073. Numeration systems; properties of the systems of whole numbers, integers, rational numbers, and real numbers; problem solving; logic. May not be applied toward a major in mathematics. (Formerly MAT 1143. Credit cannot be earned for both MAT 1153 and MAT 1143.) Generally offered: Fall, Spring, Summer. Course Fees: LRS1 \$46.20; MFSM \$30; STSI \$21.60; DL01 \$75.

MAT 1163. Essential Elements in Mathematics II. (3-0) 3 Credit Hours. (TCCN = MATH 1351)

Prerequisite: MAT 1153. Algebra, statistics and probability; geometric shapes; measurement; coordinate and transformational geometry. May not be applied toward a major in mathematics. Generally offered: Fall, Spring, Summer. Course Fees: LRS1 \$46.20; MFSM \$30; STSI \$21.60; DL01 \$75.

MAT 1193. Calculus for the Biosciences. (3-0) 3 Credit Hours. (TCCN = MATH 2313)

Prerequisite: MAT 1093 or an equivalent course or satisfactory performance on a placement examination. An introduction to calculus is presented using discrete-time dynamical systems and differential equations to model fundamental processes important in biological and biomedical applications. Specific topics to be covered are limits, continuity, differentiation, antiderivatives, definite and indefinite integrals, the fundamental theorem of calculus, differential equations, and the phase-plane. (Formerly MAT 1194. Same as MAT 1214. Credit can be earned for only one of the following: MAT 1193, MAT 1194, or MAT 1214.) May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: DL01 \$75; LRC1 \$12; LRS1 \$46.20; STSI \$21.60.

MAT 1214. Calculus I. (4-0) 4 Credit Hours. (TCCN = MATH 2413)

Prerequisite: MAT 1093 or an equivalent course or satisfactory performance on a placement examination. An introduction to the concepts of limit, continuity and derivative, mean value theorem, and applications of derivatives such as velocity, acceleration, maximization, and curve sketching; introduction to the Riemann integral and the fundamental theorem of calculus. (Same as MAT 1214 and MAT 1193. Credit can be earned for only one of the following: MAT 1214 or MAT 1193 (formerly MAT 1194).) May apply toward the Core Curriculum requirement in Mathematics. Generally offered: Fall, Spring, Summer. Course Fees: DL01 \$100; LRC1 \$16; LRS1 \$61.60; STSI \$28.80.

MAT 1224. Calculus II. (4-0) 4 Credit Hours. (TCCN = MATH 2414)

Prerequisite: MAT 1193 or MAT 1214. Methods of integration, applications of the integral, sequences, series, and Taylor expansions. (Formerly MAT 1223. Credit cannot be earned for both MAT 1224 and MAT 1223.) Generally offered: Fall, Spring, Summer. Course Fees: LRS1 \$61.60; STSI \$28.80; DL01 \$100.

MAT 1313. Algebra and Number Systems. (3-0) 3 Credit Hours.

Corequisite: MAT 1214. Basic logic and proofs. Properties of integer numbers, mathematical induction, the fundamental theorem of arithmetic, the infinitude of primes, modular arithmetic, rational and irrational numbers, complex numbers, functions, polynomials, and the binomial theorem. Generally offered: Fall, Spring. Course Fees: LRS1 \$46.20; STSI \$21.60.

MAT 2113. Functions and Modeling. (3-0) 3 Credit Hours.

Prerequisite: MAT 1093 or consent of instructor and admission to the UTeachSA teacher preparation program. In-depth study of concepts needed to teach secondary school mathematics at various levels. Emphasizes the development of the concept of function, exploring function patterns in data sets, and the connections between the main topics of mathematics associated with a secondary school curriculum. Use of appropriate technology is explored. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. (Same as UTE 2113. Credit cannot be earned for both MAT 2113 and UTE 2113.) Course Fees: LRS1 \$46.20; STSI \$21.60; DL01 \$75.

MAT 2214. Calculus III. (4-0) 4 Credit Hours. (TCCN = MATH 2415)

Prerequisite: MAT 1224. Vectors, functions of several variables, partial derivatives, line, surface and volume integrals, Green's, Stokes' and the Divergence theorems. (Formerly MAT 2213. Credit cannot be earned for both MAT 2214 and MAT 2213.) Generally offered: Fall, Spring, Summer. Course Fees: LRS1 \$61.60; STSI \$28.80; DL01 \$100.

MAT 2233. Linear Algebra. (3-0) 3 Credit Hours. (TCCN = MATH 2318)

Prerequisite: MAT 1224 or EGR 2323. Vector spaces and matrix algebra, matrices and determinants, characteristic values of matrices, and reduction to canonical forms. Emphasis on applications. Generally offered: Fall, Spring, Summer. Course Fees: LRS1 \$46.20; STSI \$21.60; DL01 \$75.

MAT 2313. Combinatorics and Probability. (3-0) 3 Credit Hours.

Prerequisite: MAT 1224. Introduction to combinatorics and graph theory; discrete and conditional probability; random variables and pdfs. Generally offered in Fall. Course Fees: LRS1 \$46.2; STSI \$21.6; DL01 \$72.

MAT 3013. Foundations of Mathematics. (3-0) 3 Credit Hours.

Prerequisite: MAT 1214. Development of theoretical tools for rigorous mathematics. Topics may include mathematical logic, propositional and predicate calculus, set theory, functions and relations, cardinal and ordinal numbers, Boolean algebras, and construction of the natural numbers, integers, and rational numbers. Emphasis on theorem proving. (Formerly MAT 2243. Credit cannot be earned for MAT 3013 and MAT 2243.) Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 3023. Perspectives on Science and Mathematics. (3-0) 3 Credit Hours.

Prerequisite: MAT 1193, MAT 1214, STA 1053, or consent of instructor. An examination of important episodes in the history of mathematics and science that illustrate the nature of scientific inquiry and convey that scientific and mathematical concepts are not static. Topics may include Galileo's conflict with the Catholic Church, Isaac Newton's formulation of the laws of motion and invention of calculus, Charles Darwin's proposal of the theory of evolution by natural selection, the development of the atomic bomb, and the discovery of the double helix structure of DNA, or others chosen by the instructor. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. (Same as UTE 3023. Credit cannot be earned for both MAT 3023 and UTE 3023. Credit cannot be earned for both MAT 3023 and MAT 4123.) Differential Tuition: \$150.

MAT 3103. Data Analysis and Interpretation. (3-0) 3 Credit Hours.

Prerequisite: MAT 1093 or consent of instructor. Measurement, sampling, summarizing and displaying data, types of data, inferential methods, nonparametric methods, qualitative research designs and methods, interpreting research results, and research design. Applications to research techniques in school-based settings will be emphasized. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 3123. Fundamentals of Geometry. (3-0) 3 Credit Hours.

Prerequisite: MAT 1093 or consent of instructor. A survey of geometric concepts, including axiomatic development of advanced Euclidean geometry, coordinate geometry, non-Euclidean geometry, three-dimensional geometry, and topology. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. Generally offered: Fall, Spring. Differential Tuition: \$150.

MAT 3213. Foundations of Analysis. (3-0) 3 Credit Hours.

Prerequisites: MAT 1224 and MAT 3013. Axiomatic definition of real numbers, including order properties and completeness; infinite sequences and their convergence; basic notions related to series and their convergence; functions and function limits. Introduction to topology of the real line. Emphasis on theorem proving. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 3223. Complex Variables. (3-0) 3 Credit Hours.

Prerequisites: MAT 2214 and MAT 3213. An introduction to complex variables, including elementary functions, line integrals, power series, residues and poles, and conformal mappings. Generally offered: Spring. Differential Tuition: \$150.

MAT 3233. Modern Algebra. (3-0) 3 Credit Hours.

Prerequisite: MAT 3013. Topics will include the development of groups, integral domains, fields, and number systems, including the complex numbers. Divisibility, congruences, primes, perfect numbers, and some other problems of number theory will be considered. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150.

MAT 3273. Applied Mathematics for Sciences and Engineering. (3-0) 3 Credit Hours.

Prerequisite: MAT 2214 or MAT 3613 or consent of instructor. Mathematical applications in biology, physics, engineering or other scientific disciplines. Topics may employ techniques of complex analysis, harmonic analysis, Fourier series, Fourier transforms, and partial differential equations. Differential Tuition: \$150.

MAT 3313. Logic and Computability. (3-0) 3 Credit Hours.

Prerequisites: MAT 1214 and MAT 3013. Recursive functions, Turing computability, insolvability, decidability, completeness and compactness of first order logic. Generally offered: Spring. Differential Tuition: \$150.

MAT 3613. Differential Equations I. (3-0) 3 Credit Hours.

Prerequisite: Completion of or concurrent enrollment in MAT 2233. Basic notions of differential equations, solution of first-order equations and linear equations with constant coefficients, n th-order initial value problems, Laplace transforms, and may include additional topics such as power series solutions of differential equations, linear systems, and stability. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 3623. Differential Equations II. (3-0) 3 Credit Hours.

Prerequisite: MAT 3613. Continuation of MAT 3613. May include topics in stability, linear systems, power series solutions, partial differential equations, and boundary value problems. Generally offered: Spring. Differential Tuition: \$150.

MAT 3633. Numerical Analysis. (3-0) 3 Credit Hours.

Prerequisites: MAT 2233, MAT 3213, and one of the following: CS 1063, CS 1714, or CS 2073. Solution of linear and nonlinear equations, curve-fitting, and eigenvalue problems. Generally offered: Fall, Spring. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 3653. Stochastic Calculus. (3-0) 3 Credit Hours.

Prerequisite: STA 3513. Probability, random walk, Brownian motion, stationary and evolutionary processes and stochastic differential equations. Differential Tuition: \$150.

MAT 4113. Computer Mathematical Topics. (3-0) 3 Credit Hours.

Prerequisite: MAT 1214. Mathematical topics from algebra, Euclidean and non-Euclidean geometry, number theory, and probability and statistics will be investigated using Geometer's Sketchpad and a variety of Web-based mathematics resources. Course will also include the application of software to the solution of a variety of geometric and algebraic problems. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. Generally offered: Spring, Summer. Differential Tuition: \$150.

MAT 4123. History of Mathematics. (3-0) 3 Credit Hours.

Prerequisites: MAT 3233 or MAT 4233, and either MAT 3123 or MAT 4263. Selected subjects in mathematics developed through historical perspectives and biographies. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. (Same as UTE 3023. Credit cannot be earned for both UTE 3023 and MAT 4123.) Generally offered: Spring, Summer. Differential Tuition: \$150.

MAT 4213. Real Analysis I. (3-0) 3 Credit Hours.

Prerequisite: MAT 3213. Continuous functions, uniform continuity; theory of differentiation; applications of the derivative to properties of functions; antiderivatives; Riemann integral; connection between differentiation and integration. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4223. Real Analysis II. (3-0) 3 Credit Hours.

Prerequisite: MAT 4213. Lebesgue integral on the real line; n -dimensional spaces; vectors; calculus of functions of several variables; multidimensional integration. Generally offered: Fall, Spring. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4233. Modern Abstract Algebra. (3-0) 3 Credit Hours.

Prerequisites: MAT 2233 and MAT 3013. Basic properties and examples of semigroups, monoids, and groups, detailed study of permutation, dihedral, and congruence groups, cyclic groups, normal subgroups, quotient groups, homomorphism, isomorphism theorems, direct products of groups, The Sylow Theorems, rings and fields and their basic properties, ideals, polynomial rings. Generally offered: Spring. Differential Tuition: \$150.

MAT 4263. Geometry. (3-0) 3 Credit Hours.

Prerequisite: MAT 3013. A study of non-Euclidean geometries, including spherical geometry, hyperbolic geometry and others. Generally offered: Spring. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4273. Topology. (3-0) 3 Credit Hours.

Prerequisite: MAT 3213. Set theory, including cardinal and ordinal numbers. Topological properties of the real-line and metric spaces. Generally offered: Fall. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4303. Capstone Course for Mathematics. (3-0) 3 Credit Hours.

Prerequisites: Consent of instructor or one each from MAT 3123 or MAT 4263, MAT 3233 or MAT 4233, and MAT 4113. This course is for any interested mathematics major, particularly for those students who intend to pursue secondary certification in Mathematics. The goals of the course are to enable students to build connections among the mathematical areas they have studied and between undergraduate mathematics and high school mathematics, to develop their understanding of mathematics as an integrated discipline, and to strengthen their oral and written communication skills in mathematics. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. Generally offered: Fall, Spring. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4333. Probability and Computing. (3-0) 3 Credit Hours.

Prerequisites: CS 3333 or MAT 2313. May include moments of random variables: randomized mincut algorithm, Chebyshev and Markov inequalities, sampling estimator for mean. Basic Concentration Inequalities: Chernoff and Hoeffding inequalities; parameter estimation and set balancing. Discrete probabilistic structures: Bucket sort algorithm, Poisson approximation, Lovasz local Lemma, independent set search. The Gaussian: Moment Generating Functions, Central Limit Theorem, JL dimensionality reduction lemma. Markov Chains and Random Walks: Stationary Distributions, and randomized 3-SAT algorithm, Entropy Function: Information and Compression. Same as CS 4333. Credit cannot be earned for both CS 4333 and MAT 4333. Generally offered in Springs. Differential Tuition: \$150.

MAT 4343. Introduction to Optimization. (3-0) 3 Credit Hours.

Prerequisites: (MAT 2214 and MAT 2233) or EGR 3323 or (MAT 1224 and CS 3333). May include Discrete, Continuous, Linear, and non-Linear optimization. Optimality conditions, Lagrange multipliers, duality theory. Applications of linear programming in computer science and discrete optimization. Gradient descent and Newton iteration (i.e., RST and second order methods), trust region methods, and conjugate gradient. Applications of RST and second order methods to engineering. Same as CS 4303. Credit cannot be earned for both CS 4303 and MAT 4343. Generally offered in Fall. Differential Tuition: \$150.

MAT 4353. Mathematical Foundations of Cryptography. (3-0) 3 Credit Hours.

Prerequisite: MAT 3233 or MAT 4233 or consent of instructor. Congruences and residue class rings, Fermat's Little Theorem, the Euler phi-function, the Chinese Remainder Theorem; complexity; symmetric-key cryptosystems; cyclic groups, primitive roots, discrete logarithms, one-way functions; public-key cryptosystems (Diffie-Hellman key exchange, RSA, Rabin, El Gamal); digital signatures; and other groups (finite fields, elliptic curves). Generally offered: Spring. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4803. Statistical Quality Control. (3-0) 3 Credit Hours.

Prerequisites: MAT 1224 and STA 3003 or STA 3513. Statistical methods are introduced in terms of problems that arise in manufacturing and their applications to the control of manufacturing processes. Topics include control charts and acceptance sampling plans. (Same as STA 4803. Credit cannot be earned for both MAT 4803 and STA 4803.) Differential Tuition: \$150.

MAT 4913. Independent Study. (0-0) 3 Credit Hours.

Prerequisites: Permission in writing (form available) from the instructor, the student's advisor, the Department Chair, and the Dean of the College in which the course is offered. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Differential Tuition: \$150.

MAT 4953. Special Studies in Mathematics. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when the topics vary, but not more than 6 semester credit hours, regardless of discipline, will apply to a bachelor's degree. Generally offered: Fall, Spring, Summer. Differential Tuition: \$150. Course fee: DL01 \$75.

MAT 4993. Honors Research. (0-0) 3 Credit Hours.

Prerequisites: Enrollment limited to candidates for College Honors during their last two semesters; approval by the College Honors Committee. Supervised research and preparation of an honors thesis. May be repeated once with approval. Differential Tuition: \$150.

UTeachSA (UTE) Courses

UTE 1111. Introduction to STEM Teaching Step 1. (1-0) 1 Credit Hour.

Introduces STEM teaching as a career. Discussions include standards and inquiry-based lesson design and various teaching and behavior management strategies. This course requires fieldwork that allows the student to observe and teach in an elementary classroom. Generally offered: Fall, Spring. Course fee: DL01 \$25.

UTE 1122. Introduction to STEM Teaching Step 2. (2-0) 2 Credit Hours.

Prerequisite: UTE 1111 with a grade of "C-" or better. Further exploration of STEM teaching as a career while building on the knowledge and skills developed in UTE 1111. Emphasis is placed on various teaching methods that are designed to meet instructional goals and learner outcomes. This course requires fieldwork that provides experience observing and teaching in a middle school STEM classroom. Generally offered: Fall, Spring. Course fee: DL01 \$50.

UTE 2113. Functions and Modeling. (3-0) 3 Credit Hours.

Prerequisites: MAT 1093 or consent of instructor, and admission to the UTeachSA teacher preparation program. In-depth study of concepts needed to teach secondary school mathematics at various levels. Emphasizes the development of the concept of function, exploring function patterns in data sets, and the connections between the main topics of mathematics associated with a secondary school curriculum. Use of appropriate technology is explored. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. (Same as MAT 2113. Credit cannot be earned for both UTE 2113 and MAT 2113).

UTE 3023. Perspectives on Science and Mathematics. (3-0) 3 Credit Hours.

Prerequisite: MAT 1193, MAT 1214, STA 1053, or consent of instructor. An examination of important episodes in the history of mathematics and science that illustrate the nature of scientific inquiry and convey that scientific and mathematical concepts are not static. Topics may include Galileo's conflict with the Catholic Church, Isaac Newton's formulation of the laws of motion and invention of calculus, Charles Darwin's proposal of the theory of evolution by natural selection, the development of the atomic bomb, and the discovery of the double helix structure of DNA, or others chosen by the instructor. May not be applied toward the Mathematics Concentration of the B.S. degree in Mathematics. (Same as MAT 3023. Credit cannot be earned for both MAT 3023 and UTE 3023. Credit cannot be earned for both UTE 3023 and MAT 4123). Differential Tuition: \$150. Course fee: DL01 \$75.

UTE 3043. UTeachSA Research Methods. (3-0) 3 Credit Hours.

Prerequisite: This course is only open to students who are participating in the UTeachSA teacher preparation program. Students design and carry out independent inquiries, which they write up and present in the manner that is common in the scientific community. Inquiries incorporate mathematics and the various science disciplines to solve research problems. (Same as BIO 3043. Credit cannot be earned for more both BIO 3043 and UTE 3043). Differential Tuition: \$150.

UTE 3203. Knowing and Learning in Mathematics and Science. (3-0) 3 Credit Hours.

Prerequisite: UTE 1111 with a grade of "C-" or better, may be taken concurrently with UTE 1111 or UTE 1122. Critical examination of issues related to what it means to know and learn in STEM classrooms. Emphasis on psychological foundations of learning, problem solving in STEM utilizing technology, principles of expert and novice understandings of subject matter, implications of high-stakes testing, and foundations of formative and summative assessment. Differential Tuition: \$150. Course fee: DL01 \$75.

UTE 3213. Classroom Interactions. (3-0) 3 Credit Hours.

Prerequisites: UTE 1122 and UTE 3203 with grades of "C-" or better. Application of learning theories in STEM instructional settings. Design and implementation of instructional activities informed by students' own understanding of what it means to know and learn mathematics and science, and outcome evaluation on the basis of student artifacts. Opportunities to develop awareness and understanding of equity issues affecting students by examining gender, class, race, culture and other diverse attributes of students and how they impact learning. Includes field experience in a middle or high school classroom. Differential Tuition: \$150. Course fee: DL01 \$75.

UTE 4203. Project-Based Instruction. (3-0) 3 Credit Hours.

Prerequisites: UTE 3213 with a grade of "C-" or better, cumulative GPA of 2.5 or higher, and admission to the Teacher Certification Program. Exploration of project-based learning environments and instructional strategies in STEM classrooms. Discussion of the foundations for designing, managing, organizing, and evaluating project-based curricula and processes in middle and high school classrooms. Includes field experience in a middle or high school classroom. Differential Tuition: \$150. Course fee: DL01 \$75.

UTE 4646. Clinical Teaching. (0-0) 6 Credit Hours.

Prerequisite: Admission to Teacher Certification Program and the clinical teaching semester, and completion of UTE 1111, UTE 1122, UTE 3203, UTE 3213, UTE 4203, and LTED 3773 with a grade of "C-" or better; can lack no more than 6 hours in content subject matter; individuals must apply to the director of clinical teaching one semester in advance. Full semester of full-day clinical teaching in grades 7–12. Student teacher will be responsible for planning, implementing, and evaluating instruction in collaboration with the cooperating teacher and in conjunction with the UTSA supervisor. Individuals pursuing a Basic Secondary Certificate, Concentration A, will student teach in the single teaching field for which certification is sought. Individuals with two teaching fields will student teach in their major teaching field. Seminars explore issues in teaching practice. (Same as CI 4646. Credit cannot be earned for both UTE 4646 and CI 4646). Differential Tuition: \$300.