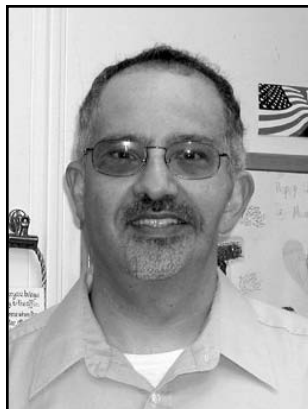


MATHEMATICS



Paul Feit, Ph.D.

Dr. Paul Feit is Professor of Mathematics and Coordinator for Mathematics. Dr. Feit received his Bachelors degree from Harvard University and his Ph.D. from Princeton University (1985).

Administered by the Department of Mathematical and Computing Sciences within the College of Arts and Sciences.

Degree Requirements

The minimum total credits required for a B.S. in Mathematics is 120.

General Education

Complete the requirements shown in the General Education Requirements section on pages 63-64 of this Catalog. It is recommended that the courses in physical and life science form a two semester sequence. Include the following specified courses:

MATH 2413

MATH 2414

Computer Use

Mathematics majors must demonstrate a basic use of computers through completion of a course such as one of the following: COSC 1335, COSC 1430 or COSC 2320.

Major Requirements

In addition to General Education and Computer Use requirements, a Bachelor of Science in Mathematics requires (1) an English course (of index 2000 or higher), (2) NTSC 4301 and (3) NTSC 4311. Also, a B.S. in Mathematics requires a minimum of eight courses (at least 24 semester hours) beyond the level of Calculus.

Plans of study in mathematics have a common core of courses including:

MATH 2413, 2414, 2415	Calculus and Analytic Geometry I, II and III
MATH 3301	Statistics
MATH 3305	Mathematical Reasoning
MATH 3310	Linear Algebra
MATH 3315	Algebraic Structures
MATH 3360	Intermediate Analysis

The remaining three advanced courses required to complete the major are selected in consultation with the student's advisor. Each course must be beyond Calculus. The final program must contain at least 18 semester hours at the 3000 and 4000 level. The choices should address the student's educational objectives and may, with prior approval of the faculty, include appropriate quantitative courses in operations research, econometrics, and computer science. No more than 45 hours of mathematics may be applied toward the 120 semester hour minimum required for a degree.

Mathematics majors at U. T. Permian Basin are required to complete a minor of at least 18 semester hours, 9 of which must be of junior or senior level. The choice of the minor is up to the student, but it is recommended that the choice also be made to facilitate the student's educational objectives.

Teacher Certification Considerations

Mathematics Majors

Mathematics majors seeking certification in 4-8 levels should take MATH 3308, Theory of Numeration as one of the advanced mathematics electives. Those candidates in certification at either the 4-8 or 8-12 level must take MATH 3350, Geometry. All certification students are strongly encouraged to elect MATH 4325, Number Theory.

TEXES Requirements

Candidates for TEXES tests in Mathematics must have completed the courses listed for each area below or equivalent courses in their teaching fields.

Mathematics 8-12: MATH 2413, 2414, 2415, 3301, 3305, 3310, 3315 and 3350.

Mathematics 4-8: MATH 2350 or 2412, 2413, 2414, 3301, 3305, 3308, and 3350.

Minor in Mathematics

Lower Level:

MATH 2413	Calculus and Analytic Geometry I	4
MATH 2414	Calculus and Analytic Geometry II	4

Upper Level:

MATH 3305	Mathematical Reasoning	3
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One from the following:

MATH 2415	Calculus and Analytical Geometry III	4
MATH 3320	Differential Equations	3
MATH 3301	Statistics	3
MATH 3360	Intermediate Analysis	3

One from the following:

MATH 3310	Linear Algebra	3
MATH 3315	Algebraic Structures	3
COSC 3312	Discrete Mathematics I	3

ONE MORE UPPER LEVEL MATH CLASS:		<u>3</u>
	TOTAL	20-21

Students minoring in Mathematics must have at least 9 credit hours at the upper level and at least 20 credit hours total, as minor electives.

Faculty in Mathematics may allow transferred credits to count towards a major or a minor in Mathematics. The number of credit hours required, at upper level or in total, cannot be reduced except by academic petition.

Course Listing

Five of the following courses are typical entrance level mathematics courses for freshmen. MATH 1332 and MATH 1333 are designed for general education. MATH 2412 is the normal course to be taken for science and mathematics students unless they are qualified to start the calculus. MATH 1324 starts the mathematics sequence addressing the needs of business and social science students. MATH 1314 is a standard College Algebra course and begins a sequence for students seeking to teach elementary school mathematics without a BA in mathematics.

MATH 0398 Beginning Algebra (3)

This course content is the study of basic algebra, including operations of algebraic expressions, polynomial factoring, algebraic fractions, linear equations with one and two variables, inequalities and exponents.

MATH 0399 Fundamentals of Mathematics (3)

Intended to prepare students for entry into MATH 1332, MATH 2412 or MATH 1324. This is a non credit course including introductory and intermediate algebra and geometry. Repeatable, but does not count towards a degree. FS

MATH 1314 College Algebra (3)[†]

Study of quadratics, polynomial, rational, logarithmic, and exponential functions; systems of equations; progressions; sequences and series; and matrices and determinants. Prerequisite: Two years of high school algebra, one year of high school geometry, and satisfactory score on placement examination or completion of MATH 0399. FS

MATH 1324 Applications of Discrete Mathematics (3)[†]

Mathematics for modeling in the social and behavioral sciences. Topics include algebra, linear equations in two variables, and exponential and logarithmic functions. Other topics are chosen by the instructor. Course emphasizes application to social science and economics. Prerequisite: Two years of high school algebra, one year of high school geometry and a satisfactory score on placement examination or completion of MATH 0399. FS

MATH 1325 Applications of Continuous Mathematics (3)[†]

This course introduces differential calculus and its applications to optimization. Applications are drawn from social science and economics. Prerequisite: MATH 1324. FS

MATH 1332 Contemporary Mathematics I (3)[†]

Modern applications of mathematics including graph theory, optimization, data organization, and social decision models. Prerequisite: Two years of high school algebra, one year of high school geometry and satisfactory score on placement examination or completion of MATH 0399. FS

MATH 1333 Contemporary Mathematics II (3)[†]

Modern application of mathematics including probability, statistics and classical and modern geometry. Brief introduction to computers and computation. Prerequisite: Two years of high school algebra, one year of high school geometry and satisfactory score on placement examination or completion of MATH 0399. FS

MATH 1350 Foundations of Elementary Mathematics I (3)[†]

Concepts of sets, functions, numeration systems, number theory; and properties of the natural numbers, integers, rational, and real number systems with an emphasis on problem-solving and critical thinking. Prerequisite: Completion of MATH 1314 with a grade of C or better.

MATH 2350 Foundations of Elementary Mathematics II (3)

Concepts of geometry, probability, and statistics, as well as applications of the algebraic properties of real numbers to concepts of measurement with an emphasis on problem-solving and critical thinking. The course is designed specifically for students who seek middle grades (4-8) teacher certification. Prerequisite: Completion of MATH 1350 with a grade of C or better, and MATH 1314.

MATH 2412 Precalculus (4)[†]

College algebra (sets, functions, relations, logic), trigonometry (circular functions, logarithms and exponential functions), and analytic geometry (standard form conic sections). Prerequisite: Two years of high school algebra, one year of high school geometry and satisfactory score on placement examination or completion of MATH 0399. FS

MATH 2413 Calculus I (4)[†]

Differentiation of functions of one variable, introduction to integration. Prerequisite: MATH 2412 or satisfactory score on placement examination. FS

MATH 2414 Calculus II (4)[†]

Continuation of MATH 2413. Integration of transcendental functions, techniques of integration, sequences and series. Prerequisite: MATH 2413 FS

MATH 2415 Calculus III (4)[†]

Continuation of MATH 2414, Vector and multivariate calculus, transformations of coordinates. Green's and Stokes' Theorem. Prerequisite: MATH 2414. S

MATH 3301 Statistics (3)

Basic concepts and applications of probability, descriptive and inferential statistics, and linear regression. Computer laboratory assignments. Prerequisite: MATH 2414. F

MATH 3305 Mathematical Reasoning (3)

Logic methods of proof, set theory, relations, functions, cardinality. Algebraic properties of the real, rational, and integer number systems. Prerequisite: MATH 2414. FS

MATH 3308 Theory of Numeration (3)

This course introduces theoretical issues behind the standard conventions for writing natural numbers, fractions, and real numbers. Topics include basic set theory, arithmetic as counting, uniqueness of prime factorization, and infinite decimal notation. Prerequisite: MATH 3305 or permission of the instructor.

MATH 3310 Linear Algebra (3)

Vectors, vector spaces, matrices, linear transformations, eigenvalues, eigenvectors, canonical forms and their applications. Prerequisite: MATH 2414. F

MATH 3315 Algebraic Structures (3)

Sets, groups, rings and fields, with applications to the ring of integers and polynomial rings. Prerequisite: MATH 3305 or permission of instructor. S

MATH 3320 Differential Equations (3)

Ordinary differential equations including power series, Laplace transform methods and systems of linear differential equations with applications. Special emphasis on existence and uniqueness of solutions. Prerequisite: MATH 2414

MATH 3350 Topics In Geometry (3)

Cross ratio, elementary transformations, Euclidean constructions, introduction to non-Euclidean geometry, and other topics in modern geometry. Prerequisite: MATH 3305. S

MATH 3360 Intermediate Analysis (3)

Limits, continuity, uniform continuity, derivatives, integrals and mean value theorems. Prerequisite: MATH 3305. F

MATH 4300 History of Computation (3)

History of mathematics from prehistoric to the present with emphasis on techniques and devices for computation. Prerequisite: MATH 2414.

MATH 4325 Number Theory (3)

Basic properties of integers, including primes, unique factorization, divisibility congruencies, Euler's phi function, Diophantine equations and other selected topics. Prerequisite: MATH 3305.

MATH 4370 Analysis of Complex Variables (3)

Complex analysis including analytic functions, power series, residues and conformal mappings. Prerequisite: MATH 3360.

MATH 4389 Selected Topics (3)

Undergraduate courses which will be offered only once or will be offered infrequently or which are being developed before a regular listing in the catalog. May be acceptable for graduate credit.

MATH 4390 Theory of Computation (3)

Turing machines, Church's thesis, recursive functions, computability and computational complexity. Prerequisite: COSC 3312 or MATH 3315.

MATH 4391 Contract Study (3)

Advanced independent study or research (equivalent to senior-level course). These courses will not count for graduate credit.

† Course fulfills general education requirements.

2007-2009 DEGREE PLAN: BS IN MATHEMATICS

GENERAL EDUCATION REQUIREMENTS (44-46 HOURS):

MATHEMATICS COURSES:

All courses require MATH 2414

- ___ English Composition, 6 sch: ENGL 1301, 1302
- ___ MATH 2415 Calculus III, 4 sch
- ___ Literature, 3 sch: ENGL 2322, 2323, 2327, 2328
- ___ MATH 3301 Statistics, 3 sch
- ___ Science with lab, 8 sch: Biology, Chemistry,
___ MATH 3305 Mathematical Reasoning, 3 sch
Geology, Physics
- ___ MATH 3310 Linear Algebra, 3 sch
- ___ U.S. History, 6 sch: HIST 1301, 1302
- ___ MATH 3315 Algebraic Structures, 3 sch
(pre: MATH 3305)
- ___ U.S. & State Govt, 6 sch: PLSC 2305, 2306
- ___ MATH 3360 Intermediate Analysis, 3 sch
(pre: MATH 3305)
- ___ Communication, 3 sch: COMM 1311, 1315,

Additional: MATH 3300, MATH 3308, MATH 3350 and 1321,
2320 MATH 4350 may suit students interested in teacher
certification.

- ___ MATH 2413 Calculus I, 3/4 sch
- ___ MATH 3xxx or 4xxx
- ___ MATH 2414 Calculus II, 3/4 sch
- ___ MATH 3xxx or 4xxx
- ___ Visual or performing arts, 3 sch
- ___ MATH 3xxx or 4xxx
- ___ Social science, 3 sch

DEPARTMENTAL REQUIREMENTS:

Students who seek teacher certification at EC-4 are not
required to complete a minor, but should complete a
minimum of 24 credits in their second teaching field.

- ___ Programming, 3 sch: COSC 1335, 1430, or 2320
- ___ Environmental Ethics, 3 sch: NTSC 4301
- ___ History & Philosophy of Science, 3 sch: NTSC 4311
- ___ Literature, 3 sch, preferably at 3xxx or 4xxx level

MINOR:

The requirements of each minor are listed in the UTPB catalog
under the discipline of the minor. A common requirement

HOURS FROM OTHER INSTITUTIONS, IF ANY:

is for 18 sch, of which 9 sch are upper level.

To graduate, a student must have:

- At least 120 sch in total from courses at UTPB or
accepted for transfer;
- At least 54 sch from upper level courses at UTPB or
upper level courses transferred;
- At least 30 from UTPB.

Freshman/sophomore total transferred: _____

Freshman/sophomore total UTPB: _____

Junior/senior level total transferred: _____

Junior/senior level total UTPB: _____

FURTHER NOTES ON GRADUATING:

1. **It is the student's responsibility to read the UTPB catalog
and be familiar with and fulfill all the requirements for
the B.S. degree.**
2. A candidate must receive a C grade in all courses that
fulfill either a General Education requirement or a major
requirement.
3. A candidate must maintain a grade point average of at
least 2.0 (or C) in all courses applicable toward the B.S.
degree.