

MATHEMATICS, BS

Program Description

The mission of the Mathematics Program at Texas A&M University-Corpus Christi is to increase the knowledge and use of mathematics by persons both at the University and in the surrounding area. We strive to educate students at the University so that they are prepared to use mathematics intelligently in their chosen fields of study and to understand mathematics as it affects their lives and participation in public affairs. In addition, the Mathematics Program provides its majors and graduate students with preparation for careers in education, science, and commerce, as well as providing a solid foundation for further study in mathematics. In support of the graduate program, the mathematics faculty pursues scholarship in mathematics, applications of mathematics, and instruction in mathematics. Finally, the Mathematics Program serves the community by providing its expertise to local schools, industry, and businesses.

Student Learning Outcomes

Students will:

- Demonstrate a command of principles of general mathematics at the undergraduate level.
- Recognize mathematics outside the realm of the classroom, and apply undergraduate level mathematical content as a matter of professional practice.
- Communicate mathematics effectively at the undergraduate level, in oral and written form, with appropriate use of technology.

There are three tracks for the degree: Secondary Mathematics Teaching, leading to teacher certification; Applied/Industrial Mathematics, preparing students for employment; and General Mathematical Studies; preparing students for further studies in mathematics. All options share a common core that consists of 32 hours of mathematics, physics and programming.

Placement and Prerequisites

Each new or transfer student entering Texas A&M University-Corpus Christi who plans to take a mathematics course will be evaluated by the University to determine the appropriate first mathematics course(s) for that student. For students who enter having successfully completed a college mathematics course, evaluation will normally be based on their college transcript. For a student who enters without having completed a college-level mathematics course, evaluation will normally be based on both that student's high-school transcript, and his or her score on standardized tests. For details on use of transcripts and scores for placement see the placement link on the Department webpage, <http://math.tamucc.edu>. Students may not enroll for their first mathematics course without having been placed into that course.

GPA in the major field of study for the BS in Mathematics is computed using those courses in the Mathematics Core, the Mathematics Track Requirements, and the Upper Level Math Electives.

Teaching Certification in Mathematics

Students who wish to teach mathematics in grades 4-12 should explore the following certification options:

- Elementary Education, BS – Grades 4-8 with Mathematics Certification (<http://catalog.tamucc.edu/undergraduate/science-engineering/teaching-certificates/elementary-education-bs-grades-4-8-mathematics-certification/>)
- Mathematics, BS – Grades 7-12 Mathematics Education Concentration (<http://catalog.tamucc.edu/undergraduate/science-engineering/teaching-certificates/mathematics-bs-grades-7-12-education-concentration/>)
- Mathematics, Grades 7-12 Teacher Certification Without a Mathematics Major (<http://catalog.tamucc.edu/undergraduate/science-engineering/teaching-certificates/mathematics-grades-7-12-teacher-certification-without-major/>)

Fast Track from Bachelor's to Master's Degree

The university allows the opportunity for high-achieving students to count a select number of graduate credits toward their undergraduate degree and thereby obtain a graduate degree at an accelerated pace. For more information, see Fast Track Mathematics, BS and Mathematics, MS (<http://catalog.tamucc.edu/undergraduate/science-engineering/fast-track/fast-track-mathematics-bs-ms/>).

General Requirements

The requirements for a Bachelor of Science degree in Mathematics include at least 120 semester hours with a minimum of 45 upper-division hours.

Requirements	Credit Hours
First-Year Seminars (when applicable) ¹	0-2
Core Curriculum Program (http://catalog.tamucc.edu/undergraduate/university-college/programs/core-curriculum-program/)	42
Mathematics Core Requirements	17
Mathematics Track Electives	15
Upper Math Electives	9-18
Minor or Career Emphasis	18-31
Electives (as needed to fulfill University graduation requirements)	2-15
Total Credit Hours	103-140

¹ Full-time, first time in college students are required to take the first-year seminars.

- UNIV 1101 First-Year Seminar I (1 sch)
- UNIV 1102 First-Year Seminar II (1 sch)

Program Requirements

Code	Title	Hours
Full-time, First-year Students ¹		
UNIV 1101	First-Year Seminar I *	1
UNIV 1102	First-Year Seminar II *	1
Core Curriculum Program		
University Core Curriculum		42
Mathematics major students will use:		

Life and Physical Science Foundational Component Area	
PHYS 2425	University Physics I (lecture hours only. 1 hr laboratory applies to Component Area Option)
PHYS 2426	University Physics II (lecture hours only. 1 hr laboratory applies to Component Area Option)
Mathematics Foundational Component Area	
MATH 2413	Calculus I (lecture hours only. 1 hr laboratory applies to Mathematics Core requirement)
Component Area Option	
MATH 2414	Calculus II
PHYS 2425	University Physics I (lab hour only)
PHYS 2426	University Physics II (lab hour only)
Mathematics Core Requirements	
MATH 2413	Calculus I (included in University Core) ^{2,3}
MATH 2414	Calculus II (included in University Core) ²
MATH 3311	Linear Algebra 3
MATH 3313	Foundations of Number Theory 3
MATH 2415	Calculus III ⁴ 4
COSC 1330	Programming for Scientists, Engineers, and Mathematicians 3
MATH 3315	Differential Equations 3
Mathematics Track Electives	
Select one of the following Tracks in consultation with the faculty mentor and with department chair approval:	15
Secondary Mathematics Teaching Track (p. 2)	
Applied/Industrial Mathematics Track (p. 2)	
General Mathematics Studies Track (p. 2)	
Upper Math Electives	
Select upper elective courses to provide further depth of study in mathematics from one of the following Tracks:	9-18
Secondary Mathematics Teaching (p. 2)	
Applied/Industrial Tracks (p. 2)	
General Mathematics Studies Track (p. 2)	
Minor or Career Emphasis	
Select 18-31 hours of electives in consultation with faculty mentor (p. 2)	18-31
Electives	
Select electives as needed to fulfill University graduation requirements including 2 hours of Physics lab	
Total Hours	104-139

¹ After confirming with an advisor, others may take electives instead.

² May be waived with suitable placement; see placement section below for more details. Upper-division classes may be required to increase total upper-division hours to the university minimum. See the degree requirements section of the catalog for details.

³ 3 hours of MATH 2413 Calculus I (4 sch) apply to the University Core Curriculum. The 1 hour laboratory component applies to the Mathematics Core requirement.

⁴ May substitute COSC 1435 Introduction to Problem Solving with Computers I (4 sch) or COSC 1436 INTRODUCTION TO PROBLEM SOLVING WITH COMPUTERS II (4 sch)

* Online offering

^ Blended offering

Secondary Mathematics Teaching Track

Code	Title	Hours
Track Electives		
MATH 3312	College Geometry	3
MATH 3314	Foundations of Real Numbers	3
MATH 3342	Applied Probability and Statistics ^{*,^}	3
MATH 4306	Modern Algebra	3
SMTE 4370	Mathematics Education Topics I	3
Upper Math Electives		
Select 9 hours of upper-division Mathematics		9
Total Hours		24

* Online offering

^ Blended offering

Applied/Industrial Mathematics Track

Code	Title	Hours
Track Electives		
MATH 3314	Foundations of Real Numbers	3
MATH 3345	Statistical Modeling and Data Analysis	3
COSC 3385	Numerical Methods	3
MATH 4301	Introduction to Analysis	3
MATH 4185	Senior Mathematics Seminar	1
MATH 4285	Mathematics Major Capstone	2
Upper Math Electives		
Select 9 hours of upper-division Mathematics		9
Total Hours		24

General Mathematics Studies Track

Code	Title	Hours
Track Electives		
MATH 3314	Foundations of Real Numbers	3
COSC 3385	Numerical Methods	3
MATH 4301	Introduction to Analysis	3
MATH 4306	Modern Algebra	3
MATH 4185	Senior Mathematics Seminar	1
MATH 4285	Mathematics Major Capstone	2
Upper Math Electives		
Select 18 hours of upper-division Mathematics		18
Total Hours		33

Minor or Career Emphasis

Students complete a major in mathematics with electives as needed. Mathematics majors must consult with a mathematics faculty mentor in choosing the electives and are advised to choose among two options. The first option is a minor, designed to provide a secondary concentration in an area of particular interest to the student, or of particular importance to his or her career plans. The second option designed for those students seeking secondary teaching certification, is a sequence of courses in Education. Details of each of these options are:

A minor consists of 18-23 specified semester hours in an approved subject. The student should consult the section of the catalog pertaining to the academic area of the minor for a description of the requirements

in that discipline. If no description is provided, the minor is subject to the approval of the department containing the minor.

Twenty-seven hours of courses as specified by the College of Education and Human Development to meet SBEC requirements for certification. An additional 4 hours to complete a "Support Field" will be required. Consult the "Professional Development and Reading Sequence" of the BS in Mathematics—Grades 7-12 section of the SMTE portion of the catalog for more details.

Courses

MATH 0099 Math Non-Course Based Development

0 Semester Credit Hours

PREPARATION WORKSHOP TO HELP STUDENTS ACHIEVE COLLEGE READINESS IN MATHEMATICS UNDER THE TEXAS SUCCESS INITIATIVE. TOPICS INCLUDE FIVE GENERAL AREAS: FUNDAMENTAL MATHEMATICS, ALGEBRA, GEOMETRY, STATISTICS, AND PROBLEM SOLVING.

MATH 0200 Brief Developmental Mathematics

1-2 Semester Credit Hours (1-2 Lecture Hours)

TOPICS AS IN MATH 0300. FOR STUDENTS WHO HAVE COMPLETED MOST TOPICS IN MATH 0300. REQUIRES PERMISSION OF MATH DEPARTMENT. (NOT COUNTED TOWARD GRADUATION) FALL, SPRING, MAYMESTER, SUMMER.

Co-requisite: MATH 1314, MATH 1442.

MATH 0214 Brief Developmental Mathematics-Algebra

2 Semester Credit Hours (2 Lecture Hours)

THIS COURSE IS CO-REQUISITE COURSE SUPPORTING FOR MATH 1314. SUPPORT WILL FOCUS ON ESSENTIAL SKILLS REQUIRED FOR SUCCESS IN COLLEGE ALGEBRA (MATH 1314). SUPPORTING TOPICS INCLUDE REVIEW OF INTERMEDIATE ALGEBRA, POLYNOMIAL EQUATIONS, GRAPHING TECHNIQUES, AND APPLICATIONS. COURSE PROVIDES THE NECESSARY ACADEMIC SUPPORT FOR TSI LIABLE STUDENTS CONCURRENTLY ENROLLED IN MATH 1314 AS THE CO-REQUISITE WITH MATH 0214. STUDENTS WHO REGISTER FOR MATH 0214 MUST CO-REGISTER IN MATH 1314. MATH 0214 IS NOT COUNTED TOWARD GRADUATION. FALL, SPRING, SUMMER.

Co-requisite: MATH 1314.

MATH 0224 Brief Developmental Mathematics-Business Mathematics

2 Semester Credit Hours (2 Lecture Hours)

THIS COURSE IS THE CO-REQUISITE COURSE SUPPORTING FOR MATH 1324. SUPPORT WILL FOCUS ON ESSENTIAL SKILLS REQUIRED FOR SUCCESS IN BUSINESS MATH (MATH 1324). SUPPORTING TOPICS INCLUDE THE USE OF CALCULATORS AND TECHNOLOGY. TOPICS FOCUS ON BASIC REVIEW OF MATHEMATICAL SKILLS, ELEMENTARY ALGEBRA, MATHEMATICAL AND LOGICAL REASONING, PROBABILITY, AND FINANCIAL MANAGEMENT, WHILE PROVIDING THE NECESSARY ACADEMIC SUPPORT FOR TSI LIABLE STUDENTS CONCURRENTLY ENROLLED IN MATH 1324 AS THE CO-REQUISITE WITH MATH 0224.

STUDENTS WHO REGISTER FOR MATH 0224 MUST CO-REGISTER IN MATH 1324. MATH 0224 IS NOT COUNTED TOWARD GRADUATION. FALL, SPRING, SUMMER.

Co-requisite: MATH 1324.

MATH 0232 Brief Developmental Mathematics-Contemporary Mathematics

2 Semester Credit Hours (2 Lecture Hours)

THIS COURSE IS CO-REQUISITE COURSE SUPPORTING FOR MATH 1332. SUPPORT WILL FOCUS ON ESSENTIAL SKILLS REQUIRED FOR SUCCESS IN CONTEMPORARY MATHEMATICS (MATH 1332). SUPPORTING TOPICS INCLUDE A BASIC REVIEW OF MATHEMATICAL SKILLS, ELEMENTARY ALGEBRA, MATHEMATICAL AND LOGICAL REASONING, PROBABILITY, AND DESCRIPTIVE STATISTICS, WHILE PROVIDING THE NECESSARY ACADEMIC SUPPORT FOR TSI LIABLE STUDENTS CONCURRENTLY ENROLLED IN MATH 1332 AS THE CO-REQUISITE WITH MATH 0232. STUDENTS WHO REGISTER FOR MATH 0232 MUST CO-REGISTER IN MATH 1332. MATH 0232 IS NOT COUNTED TOWARD GRADUATION. FALL, SPRING, SUMMER.

Co-requisite: MATH 1332.

MATH 0242 Brief Developmental Mathematics-Statistics

2 Semester Credit Hours (2 Lecture Hours)

THIS COURSE IS CO-REQUISITE COURSE SUPPORTING FOR MATH 1442. SUPPORT WILL FOCUS ON ESSENTIAL SKILLS REQUIRED FOR SUCCESS IN STATISTICS FOR LIFE (MATH 1442). SUPPORTING TOPICS INCLUDE THE USE OF CALCULATORS AND TECHNOLOGY. TOPICS FOCUS ON DESCRIPTIVE AND INFERENCE STATISTICS, PROBABILITIES INCLUDING NOTATION, WHILE PROVIDING THE NECESSARY ACADEMIC SUPPORT FOR TSI LIABLE STUDENTS CONCURRENTLY ENROLLED IN MATH 1442 AS THE CO-REQUISITE WITH MATH 0242. STUDENTS WHO REGISTER FOR MATH 0242 MUST CO-REGISTER IN MATH 1442. MATH 0242 IS NOT COUNTED TOWARD GRADUATION. FALL, SPRING, SUMMER.

Co-requisite: MATH 1442.

MATH 0300 Developmental Mathematics

3 Semester Credit Hours (3 Lecture Hours)

TOPICS INCLUDE NUMBER CONCEPTS, COMPUTATION, ELEMENTARY ALGEBRA, GEOMETRY, AND MATHEMATICAL REASONING. ALSO, LINEAR EQUATIONS AND INEQUALITIES, RATIONAL EXPRESSIONS, EXPONENTS AND RADICALS, QUADRATICS AND WORD PROBLEMS. MAY BE REPEATED FOR CREDIT AS NEEDED TO COMPLETE MASTERY OF ALL TOPICS. (NOT COUNTED TOWARD GRADUATION.) FALL, SPRING, SUMMER.

MATH 0310 Development Mathematics-Algebra

3 Semester Credit Hours (2 Lecture Hours, 2 Lab Hours)

3 SEM. HRS. (2:2) TOPICS INCLUDE NUMBER CONCEPTS, COMPUTATION, ELEMENTARY ALGEBRA, AND GEOMETRY. ALSO, LINEAR EQUATIONS AND INEQUALITIES, RATIONAL EXPRESSIONS, EXPONENTS AND RADICALS, QUADRATICS AND WORD PROBLEMS. MAY BE REPEATED FOR CREDIT AS NEEDED TO COMPLETE MASTERY OF ALL TOPICS. (NOT COUNTED TOWARD GRADUATION.) FALL, SPRING, SUMMER.

MATH 0398 Introduction to Algebra

3 Semester Credit Hours (3 Lecture Hours)

NUMBER CONCEPTS, COMPUTATION, ELEMENTARY ALGEBRA, GEOMETRY, AND MATHEMATICAL REASONING.

MATH 0399 Intermediate Algebra

3 Semester Credit Hours (3 Lecture Hours)

TOPICS INCLUDE LINEAR EQUATIONS AND INEQUALITIES, RATIONAL EXPRESSIONS, EXPONENTS AND RADICALS, QUADRATICS AND WORD PROBLEMS.

Prerequisite: MATH 0398.

MATH 1314 College Algebra**3 Semester Credit Hours (3 Lecture Hours)**

QUADRATIC EQUATIONS, INEQUALITIES, GRAPHS, LOGARITHMS AND EXPONENTIALS, THEORY OF POLYNOMIAL EQUATIONS, SYSTEMS OF EQUATIONS.

Prerequisite: MATH 0300, minimum score of 530 in 'SAT MATH SECTION', minimum score of 19 in 'ACT1 Math', MATH 0320 or minimum score of 350 in 'TSI Math'.

TCCNS: MATH 1314

MATH 1316 Trigonometry**3 Semester Credit Hours (3 Lecture Hours)**

TRIGONOMETRIC FUNCTIONS, IDENTITIES, EQUATIONS INVOLVING TRIGONOMETRIC FUNCTIONS, SOLUTIONS OF RIGHT AND OBLIQUE TRIANGLES.

Prerequisite: (MATH 1314, minimum score of 550 in 'SAT MATH SECTION' or minimum score of 21 in 'ACT1 Math') or minimum score of 21 in 'ACT Math'.

TCCNS: MATH 1316

MATH 1324 Mathematics for Business and Social Sciences**3 Semester Credit Hours (3 Lecture Hours)**

STUDENTS WILL LEARN HOW THE PROPERTIES AND LANGUAGE OF MATHEMATICS CAN BE USED IN BUSINESS AND REAL-WORLD PROBLEM SOLVING AND UNDERSTAND THE TECHNIQUES AND APPLICATIONS OF FINANCE PROBLEMS, BASIC MATRIX OPERATION, BASIC COUNTING PRINCIPLES, AND PROBABILITY ANALYSIS IN MODELING REAL-WORLD SCENARIOS.

Prerequisite: minimum score of 550 in 'SAT MATH SECTION', minimum score of 21 in 'ACT Math' or minimum score of 21 in 'ACT1 Math'.

TCCNS: MATH 1324

MATH 1325 Calculus for Business & Social Sciences**3 Semester Credit Hours (3 Lecture Hours)**

STUDENTS WILL DEVELOP AND COMBINE THE CONCEPTS IN AND RELATIONSHIPS BETWEEN MATHEMATICS AND BUSINESS FROM THE FUNDAMENTALS OF CALCULUS AND OPTIMIZATION IN ALL BUSINESS FIELDS. STUDENTS ARE EXPECTED TO LEARN THE MATERIALS ALGEBRAICALLY WITH TECHNOLOGY. STUDENTS WILL COMBINE THE CONCEPTS OF LIMITS, CONTINUATION, DIFFERENTIATION AND INTEGRATION TECHNIQUES TO SOLVE PROBLEMS IN BUSINESS, ECONOMICS, AND SOCIAL SCIENCES.

Prerequisite: MATH 1324, minimum score of 550 in 'SAT Math', minimum score of 21 in 'ACT Math' or minimum score of 21 in 'ACT1 Math'.

TCCNS: MATH 1325

MATH 1332 Contemporary Mathematics**3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE SERVES AS A TERMINAL COURSE AND SUPPLIES A BRIEF OVERVIEW OF SEVERAL TOPICS IN MATHEMATICS. TOPICS MAY INCLUDE INTRODUCTORY TREATMENTS OF SETS, LOGIC, NUMBER SYSTEMS, NUMBER THEORY, RELATIONS, FUNCTIONS, PROBABILITY AND STATISTICS. APPROPRIATE APPLICATIONS ARE INCLUDED. THIS COURSE EMPHASIZES USING CRITICAL THINKING TO MAKE DECISIONS BASED ON INFORMATION.

TCCNS: MATH 1332

MATH 1390 Introduction to Mathematical Topics**1-3 Semester Credit Hours (1-3 Lab Hours)**

A COURSE TO INTRODUCE STUDENTS TO MATHEMATICAL TOPICS IN A FORMAL SETTING. THE COURSE MAY SUPPORT PROBLEM SOLVING, OR SYSTEMATIC INVESTIGATIONS OF TOPICS OUTSIDE THE CURRENT MATHEMATICAL CATALOG. MAY NOT BE SUBSTITUTED FOR REGULARLY SCHEDULED OFFERINGS.

MATH 1442 Statistics for Life**4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)**

AN INTRODUCTION TO STATISTICAL CONCEPTS AND METHODS USED IN ALL DISCIPLINES TO ENHANCE DECISION MAKING BASED ON DATA ANALYSIS, INCLUDING: BASIC EXPERIMENTAL DESIGN MODELS, MEASUREMENT AND DATA COLLECTION THROUGH SAMPLING; DISPLAY AND SUMMARY OF INFORMATION, AND ASSESSMENT OF RELATIONSHIP THROUGH DESCRIPTIVE TECHNIQUES; PROBABILITY CONCEPTS LEADING TO ESTIMATION AND HYPOTHESIS TESTING OF MEANS, VARIANCE AND PROPORTIONS, REGRESSION ANALYSIS, ONE-FACTOR ANOVA AND CHI-SQUARE TEST OF INDEPENDENCE; AND APPLICATIONS THROUGH CASE STUDIES. THE LABORATORY COMPONENT OF THE COURSE OFFERS APPLICATIONS OF THE THEORY PRESENTED DURING THE CLASSROOM SESSIONS.

Prerequisite: MATH 0300, minimum score of 530 in 'SAT MATH SECTION', minimum score of 19 in 'ACT1 Math', MATH 0310, 0320, minimum score of 350 in 'TSI Math' or minimum score of 19 in 'ACT Math'.

TCCNS: MATH 1442

MATH 2305 Discrete Mathematics I**3 Semester Credit Hours (3 Lecture Hours)**

AN INTRODUCTION TO TOPICS IN DISCRETE MATHEMATICS WITH AN EMPHASIS ON APPLICATIONS IN MATHEMATICS AND COMPUTER SCIENCE. TOPICS INCLUDE FORMAL LOGIC, GRAPHS, TREES AND RELATED ALGORITHMS, AND COMBINATORICS AND DISCRETE PROBABILITY.

Prerequisite: MATH 2413, minimum score of 620 in 'SAT Math', minimum score of 620 in 'SAT1 Mathematics', minimum score of 640 in 'SAT MATH SECTION', minimum score of 27 in 'ACT Math' or minimum score of 27 in 'ACT1 Math'.

TCCNS: MATH 2305

MATH 2312 Precalculus**3 Semester Credit Hours (3 Lecture Hours)**

A MORE RAPID TREATMENT OF THE MATERIAL IN MATH 1314 AND MATH 1316. THIS COURSE IS DESIGNED FOR STUDENTS WHO WISH A REVIEW OF THE ABOVE MATERIAL, OR WHO ARE VERY WELL PREPARED. FUNCTIONS, GRAPHS, TRIGONOMETRY, AND ANALYTIC GEOMETRY.

Prerequisite: MATH 1314, minimum score of 550 in 'SAT MATH SECTION', minimum score of 21 in 'ACT Math' or minimum score of 21 in 'ACT1 Math'.

TCCNS: MATH 2312

MATH 2413 Calculus I**4 Semester Credit Hours (4 Lecture Hours, 2 Lab Hours)**

LIMITS, CONTINUITY, DERIVATIVES, APPLICATIONS OF THE DERIVATIVE, AND AN INTRODUCTION TO INTEGRALS. CONTAINS A LABORATORY COMPONENT.

Prerequisite: MATH 1316, 2312, minimum score of 640 in 'SAT MATH SECTION' or minimum score of 27 in 'ACT1 Math'.

TCCNS: MATH 2413

MATH 2414 Calculus II**4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)**

TECHNIQUES OF INTEGRATION, APPLICATIONS OF INTEGRALS, SEQUENCES, SERIES, TAYLOR POLYNOMIALS AND SERIES. PARAMETRIC EQUATIONS. CONTAINS A LABORATORY COMPONENT.

Prerequisite: MATH 2413.

TCCNS: MATH 2414

MATH 2415 Calculus III**4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)**

VECTORS AND SPACE CURVES, PARTIAL DERIVATIVES, MULTIPLE INTEGRALS, SPECIAL COORDINATE SYSTEMS, LINE AND SURFACE INTEGRALS, GREEN'S, STOKES', AND THE DIVERGENCE THEOREMS. CONTAINS A LABORATORY COMPONENT.

Prerequisite: MATH 2414.

TCCNS: MATH 2415

MATH 3300 Geospatial Mathematical Techniques**3 Semester Credit Hours (3 Lecture Hours)**

CHARACTERISTICS OF GEOGRAPHIC/SPATIAL INFORMATION; OVERVIEW OF RELEVANT SECTIONS OF NUMBERS, ALGEBRA AND GEOMETRY, PLANE AND SPHERICAL TRIGONOMETRY, MATRICES, DETERMINANTS AND VECTORS, CURVES AND SURFACES, INTEGRAL AND DIFFERENTIAL CALCULUS, PARTIAL DERIVATIVES, WITH AN EMPHASIS ON GEOSPATIAL APPLICATIONS. CONCEPTS OF GEOSPATIAL COORDINATE SYSTEMS AND GEOSPATIAL COORDINATE TRANSFORMATIONS; OVERVIEW OF SPATIAL STATISTICS AND BEST-FIT SOLUTIONS WITH GEOSPATIAL APPLICATIONS. STUDENTS MAY NOT RECEIVE CREDIT FOR BOTH MATH 3300 AND GISC 3300.

Prerequisite: MATH 2413 and 2414.

MATH 3301 Introduction to Complex Analysis**3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE INTRODUCES FUNCTIONS OF A COMPLEX VARIABLE AND THEIR APPLICATIONS. CONTENTS INCLUDE DIFFERENTIATION AND INTEGRATION; ZEROS, POLES AND RESIDUES; CONFORMAL MAPPINGS.

Prerequisite: (MATH 2415) or (MATH 2414 and 3314).

MATH 3310 Mathematical Analysis for Mechanical Engineering**3 Semester Credit Hours (3 Lecture Hours)**

APPLICATIONS OF FUNDAMENTALS OF LINEAR ALGEBRA, VECTOR ANALYSIS, NUMERICAL METHODS, COMPUTER PROGRAMMING AND PROBABILITY AND STATISTICS INTO MECHANICAL ENGINEERING. MAY NOT COUNT TOWARDS THE MATH MAJOR. STUDENTS MAY NOT RECEIVE CREDIT FOR BOTH MATH 3310 AND MEEN 3310.

Prerequisite: MATH 3315.

MATH 3311 Linear Algebra**3 Semester Credit Hours (3 Lecture Hours)**

FUNDAMENTALS OF LINEAR ALGEBRA AND MATRIX THEORY. TOPICS INCLUDE VECTORS, MATRIX OPERATIONS, LINEAR TRANSFORMATIONS, FUNDAMENTAL PROPERTIES OF VECTOR SPACES, SYSTEMS OF LINEAR EQUATIONS, EIGENVALUES AND EIGENVECTORS. APPLICATIONS.

Prerequisite: MATH 2413.

MATH 3312 College Geometry**3 Semester Credit Hours (2 Lecture Hours, 2 Lab Hours)**

A CAREFUL STUDY OF THE FOUNDATIONS OF EUCLIDEAN GEOMETRY BY SYNTHETIC METHODS WITH AN INTRODUCTION TO NON-EUCLIDEAN GEOMETRIES. AN INTRODUCTION TO TRANSFORMATIONAL GEOMETRY.

Prerequisite: MATH 2413.

MATH 3313 Foundations of Number Theory**3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE ASSISTS A STUDENT'S TRANSITION TO ADVANCED MATHEMATICS. FUNDAMENTALS OF LOGIC AND PROOF ARE REVIEWED AND APPLIED TO TOPICS FROM ELEMENTARY NUMBER THEORY.

Prerequisite: MATH 2305 and 2414.

MATH 3314 Foundations of Real Numbers**3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE ASSISTS A STUDENT'S TRANSITION TO ADVANCED MATHEMATICS. FUNDAMENTALS OF LOGIC AND PROOF ARE REVIEWED AND APPLIED TO DEVELOPMENT OF THE REAL NUMBER LINE.

Prerequisite: MATH 2414 and 2305.

MATH 3315 Differential Equations**3 Semester Credit Hours (3 Lecture Hours)**

AN INTRODUCTION TO BOTH THEORETICAL AND APPLIED ASPECTS OF ORDINARY DIFFERENTIAL EQUATIONS. TOPICS INCLUDE: FIRST ORDER EQUATIONS, LINEAR SECOND ORDER EQUATIONS, ELEMENTARY NUMERICAL METHODS, AND THE LAPLACE TRANSFORM.

Prerequisite: MATH 2414.

MATH 3342 Applied Probability and Statistics**3 Semester Credit Hours (3 Lecture Hours)**

A CALCULUS BASED INTRODUCTION TO PROBABILITY AND STATISTICS. EMPHASIS WILL BE ON DEVELOPMENT OF STATISTICAL THINKING AND WORKING WITH DATA. TOPICS INCLUDE PROBABILITY THEORY, DESCRIPTIVE STATISTICS, COMMON DISTRIBUTIONS, AND STATISTICAL INFERENCE.

Prerequisite: MATH 2413.

MATH 3345 Statistical Modeling and Data Analysis**3 Semester Credit Hours (3 Lecture Hours)**

AN INTRODUCTION TO PROBABILITY/STATISTICAL MODELING AND DATA ANALYSIS TECHNIQUES TO INVESTIGATE DATA. TOPICS INCLUDE: EXPLORATORY DATA ANALYSIS, PROBABILITY MODELS AND SIMULATION, SAMPLING DISTRIBUTIONS, STATISTICAL INFERENCE. APPLICATIONS TO REAL WORLD PROBLEMS. STUDENTS WILL BE EXPECTED TO PRESENT AND JUSTIFY RESULTS ORALLY AND IN WRITING.

Prerequisite: MATH 2413 and (COSC 1330 or 1435).

MATH 3347 Introduction to Probability**3 Semester Credit Hours (3 Lecture Hours)**

THIS IS AN INTRODUCTION TO PROBABILITY. IN THE COURSE, KEY FUNDAMENTAL CONCEPTS OF PROBABILITY, RANDOM VARIABLES AND THEIR DISTRIBUTIONS, EXPECTATIONS, AND CONDITIONAL PROBABILITIES WILL BE COVERED. TOPICS INCLUDE COUNTING RULES, COMBINATORIAL ANALYSIS, SAMPLE SPACES, AXIOMS OF PROBABILITY, CONDITIONAL PROBABILITY AND INDEPENDENCE, DISCRETE AND CONTINUOUS RANDOM VARIABLES, JOINTLY DISTRIBUTED RANDOM VARIABLES, CHARACTERISTICS OF RANDOM VARIABLES, LAW OF LARGE NUMBERS AND CENTRAL LIMIT THEOREM, RANDOM PROCESSES, MARKOV CHAINS, MARKOV CHAIN-MONTE CARLO, POISSON PROCESS AND ENTROPY.

Prerequisite: MATH 2415.

MATH 3385 Linear Optimization and Decisions**3 Semester Credit Hours (3 Lecture Hours)**

THIS COURSE INTRODUCES THE LINEAR PROGRAMMING AND OPTIMIZATION PROBLEMS ARISING IN MANY APPLICATIONS. CONTENTS INCLUDE LINEAR PROGRAMMING MODELS WITH SOLUTIONS, THE SIMPLEX METHOD, DUALITY THEORY AND ITS USE FOR MANAGEMENT DECISION MAKING, DUAL SIMPLEX METHOD AND SENSITIVITY ANALYSIS.

Prerequisite: MATH 3311 and 2413.

MATH 3390 Problem Solving in Mathematics**1-3 Semester Credit Hours (1-3 Lecture Hours)**

A PROBLEM SOLVING COURSE FOR STUDENTS WHO WANT TO PARTICIPATE IN MATH PROBLEM SOLVING COMPETITIONS, TRAIN FOR THE ACTUARIAL OR OTHER PROFESSIONAL EXAMINATIONS, WORK ON RESEARCH AIMED AT CONFERENCE PRESENTATIONS, OR PERFORM RESEARCH PROJECTS AT THE JUNIOR LEVEL THAT ARE NOT AT THE LEVEL OF DIRECTED INDEPENDENT STUDY MATERIAL.

Prerequisite: MATH 2414.

MATH 4185 Senior Mathematics Seminar**1 Semester Credit Hour (1 Lecture Hour)**

THIS COURSE INTRODUCES A WEEKLY MATHEMATICS SEMINAR. STUDENTS WILL GENERATE A VIABLE PROJECT FOR THE CAPSTONE COURSE.

MATH 4285 Mathematics Major Capstone**2 Semester Credit Hours (2 Lecture Hours)**

DEVELOPMENT OF PROJECTS AS PROPOSED IN MATH 4185, AS WELL AS MATHEMATICS COMMUNICATION SKILLS. STUDENTS WILL PRESENT THEIR PROJECTS, AND TAKE A NATIONAL LEVEL ASSESSMENT.

Prerequisite: MATH 4185.

MATH 4301 Introduction to Analysis**3 Semester Credit Hours (3 Lecture Hours)**

AN ADVANCED TREATMENT OF THE FOUNDATIONS OF CALCULUS STRESSING RIGOROUS PROOFS OF THEOREMS. TOPICS INCLUDE: ELEMENTS OF PROPOSITIONAL AND PREDICATE LOGIC, TOPOLOGY OF THE REAL NUMBERS, SEQUENCES, LIMITS, THE DERIVATIVE, AND THE RIEMANN INTEGRAL.

Prerequisite: MATH 2415 and 3314.

MATH 4306 Modern Algebra**3 Semester Credit Hours (3 Lecture Hours)**

FUNDAMENTALS OF SET OPERATIONS, MAPS AND RELATIONS, GROUPS, RINGS AND FIELD THEORY. TOPICS INCLUDE PERMUTATION GROUPS, COSETS, HOMOMORPHISMS AND ISOMORPHISMS, DIRECT PRODUCT OF GROUPS AND RINGS, INTEGRAL DOMAINS FIELD OF QUOTIENTS, FUNDAMENTAL PROPERTIES OF INTEGERS, THE RING OF INTEGERS MODULO N , AND RINGS OF POLYNOMIALS. APPLICATIONS.

Prerequisite: MATH 3311 and 3313.

MATH 4312 Differential Geometry**3 Semester Credit Hours (3 Lecture Hours)**

DIFFERENTIAL FORMS ON R^1 , R^2 , R^3 , AND R^N ; INTEGRATION AND DIFFERENTIATION OF DIFFERENTIAL FORMS; STOKES' THEOREM; MANIFOLDS; GAUSSIAN CURVATURE AND THE GAUSS-BONNET THEOREM.

Prerequisite: MATH 2415.

MATH 4315 Partial Differential Equations**3 Semester Credit Hours (3 Lecture Hours)**

AN INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS EMPHASIZING THE WAVE, DIFFUSION AND POTENTIAL (LAPLACE) EQUATIONS. A FOCUS ON UNDERSTANDING THE PHYSICAL MEANING AND MATHEMATICAL PROPERTIES OF SOLUTIONS OF PARTIAL DIFFERENTIAL EQUATIONS. METHODS INCLUDE FUNDAMENTAL SOLUTIONS AND TRANSFORM METHODS FOR PROBLEMS ON THE LINE, AND SEPARATION OF VARIABLES USING ORTHOGONAL SERIES FOR PROBLEMS IN REGIONS WITH BOUNDARY. ADDITIONAL TOPICS INCLUDE HIGHER DIMENSIONAL PROBLEMS AND SPECIAL TOPICS LIKE HARMONIC FUNCTIONS, THE MAXIMUM PRINCIPLE, GREEN'S FUNCTIONS ETC.

Prerequisite: MATH 3315 and 2415.

MATH 4321 Applied Regression Analysis**3 Semester Credit Hours (3 Lecture Hours)**

INTRODUCTION TO THE FORMULATION OF LINEAR MODELS AND THE ESTIMATION OF THE PARAMETERS OF SUCH MODELS, WITH PRIMARY EMPHASIS ON LEAST SQUARES. APPLICATION OF MULTIPLE REGRESSION AND CURVE FITTING AND THE DESIGN OF EXPERIMENTS FOR FITTING REGRESSION MODELS.

Prerequisite: MATH 1342, 2342 or 1470.

MATH 4328 Discrete Mathematics II**3 Semester Credit Hours (3 Lecture Hours)**

A CONTINUED STUDY OF TOPICS FROM DISCRETE MATHEMATICS I WITH ADDITIONAL TOPICS FROM DISCRETE MATHEMATICS THAT HAVE STRONG APPLICATION TO THE FIELD OF COMPUTER SCIENCE. ADDITIONAL TOPICS INCLUDE: RECURRENCE RELATIONS, FORMAL LANGUAGES, AND FINITE-STATE MACHINES.

Prerequisite: MATH 2305 and COSC 2437.

MATH 4342 Introduction to Mathematical Statistics**3 Semester Credit Hours (3 Lecture Hours)**

THIS IS A FIRST COURSE IN MATHEMATICAL STATISTICS, TOPICS INCLUDE: MOMENT-GENERATING FUNCTIONS, FUNCTIONS OF RANDOM VARIABLES, SAMPLING DISTRIBUTIONS, METHODS OF ESTIMATION INCLUDING BAYESIAN ESTIMATION, CHARACTERISTICS OF ESTIMATORS, INTERVAL ESTIMATION, HYPOTHESIS TESTING, NEYMAN-PEARSON LEMMA, LIKELIHOOD RATIO TEST, TESTS INVOLVING MEANS AND VARIANCES, REGRESSION AND CORRELATION, MULTIPLE LINEAR REGRESSION, INTRODUCTION TO ANOVA, NON-PARAMETRIC TESTS.

Prerequisite: MATH 2415.

MATH 4385 Applied Modeling**3 Semester Credit Hours (3 Lecture Hours)**

CAPSTONE COURSE FOR MATHEMATICS MAJORS. THE CONSTRUCTION OF MATHEMATICAL MODELS FROM AREAS SUCH AS ECONOMICS, REFINING, BIOLOGY AND MARICULTURE, ETC. WHERE POSSIBLE, LOCAL PHENOMENA WILL BE MODELED WITH THE ASSISTANCE OF OUTSIDE CONSULTANTS.

Prerequisite: MATH 3315 and 3342 or MATH 3345.

MATH 4390 Selected Topics**3 Semester Credit Hours (3 Lecture Hours)**

OFFERED ON SUFFICIENT DEMAND.

MATH 4696 Directed Independent Study**1-6 Semester Credit Hours**

SEE COLLEGE DESCRIPTION.