

Paris Junior College &  
Texas A&M University – Texarkana  
2020-2021 Guided Pathways

Associate of Science in Mathematics to  
Bachelor of Science in Mathematics with  
7-12 Mathematics Certification

PJC		A&M-TEXARKANA	
COURSES	HOURS	COURSES	HOURS
EDUC/PSYC 1100	1	MATH 321	3
ENGL 1301	3	MATH 334	3
ENGL 1302	3	MATH 357	3
MATH 2312	3	MATH 380	3
MATH 2413	4	MATH 430	3
MATH 2414	4	MATH 437	3
MATH 2415	4	MATH 493	3
COSC 1301	3	RDG 343	3
HIST 1301	3	UD Electives	12
HIST 1302	3	ED 311	3
GOVT 2305	3	ED 321	3
GOVT 2306	3	BLOCK 1	
MUSI 1306	3	ED 495	3
COMM 1307	3	ED 331	3
PHYS 2425	4	BLOCK 2	
PHYS 2426	4	ED 496	3
ECON 2301	3	SPED 418	3
COSC 1336	3		
COSC 1337	3		
OTHER REQUIREMENTS:			
MATH 2305	3		
MATH 2318	3		
MATH 2320	3		
2.8 Minimum GPA			
TOTAL	69	TOTAL	123

\*Other Courses may Apply. See PJC Degree Plan for Options  
54 Upper Division (UD) Hours Required for the BS Degree  
30 Hours of Residency Required

## Traditional Undergraduate Teacher Preparation Program

Applications for admission to the Teacher Preparation Program are accepted in September for the following spring semester and in February for the following fall semester.

1. Application to program submitted through [TK20](#), to include the following:
  - Disposition Survey
  - Code of Ethics Reflection Statement
  - Completed FERPA form
2. Overall GPA of 2.80 or higher
3. Completion of Pre-Content TExES, an Oral-Language Assessment, and a Writing Sample at required TPP Orientation
4. Completed hours in content area:< >For grades 4-8 or 7-12 Science or Math content area certifications, candidates must have 15 semester hours from content area with **no grade below "C"**. All other 4-8/7-12 certification candidates must have completed 12 semester hours in content area with **no grade below "C"**. For EC-6 certifications, 12 semester hours from the list below (**no grade below "C"**):
  - 3 semester hours from ENG prefix (not [ENGL 1301](#) or [ENGL 1302](#))
  - 3 semester hours from MATH prefix
  - 3 semester hours from GOVT or HIST prefix
  - 3 semester hours from BIOL, PHYS, or CHEM prefix
  - 3 semester hours from Arts or Technology
5. Advisement
6. Payment of Texas Education Agency mandated \$55.00 assessment fee

### For Admission to Block #1 Semester

1. A Notice of Intent for Block #1 semester submitted in [TK20](#) in September for the following spring semester and in February for the following fall semester.
2. Must have completed [ED 311](#) with appropriate grade
3. Minimum of 2.80 GPA overall; no grade below "C" in upper-division courses
4. Essay submitted and Criminal History background cleared
5. Positive school district interview

### For Admission to the Block #2 Co-Teaching Semester

1. Passing scores on all required TExES examinations
2. Successful completion of Block #1 semester as determined by Director of Teacher Preparation Program
3. Maintain 2.80 cumulative GPA ; no grade below "C" in upper-division courses

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**Texas A&M University – Texarkana**  
**Course Descriptions**

**ED 311. Growth and Development for EC to Grade 12 (EL). 3 Hours.** This is an introductory education course which presents theories of children's growth and development along with their relationship to learning and teaching. Cultural, emotional, physical, intellectual, and learning differences are studied for their impact on learning and educational opportunity. Students must be considered in their junior year and will be required to participate in 8 hours of field experience. This course integrates the principles of Experiential Learning and meets the criteria of field work.

**ED 321. Foundations of Education for Secondary (EL). 3 Hours.** This course provides students seeking certification in grades 4-8 and 7-12 skills for designing instruction and assessment that promote a growth mindset and create a positive, productive classroom environment. Students will apply skills and knowledge in lesson and unit planning as well as content pedagogy specific to area of certification. Traditional as well as innovative technologies will be addressed. State of Texas Assessments of Academic Readiness (STAAR) and End of Course Exams (EOC) effective content pedagogy will be emphasized in this course. This course integrates the principles of Experiential Learning and meets the criteria for field work.

**ED 331. Classroom and Behavior Management. 3 Hours.** This course presents best practices in classroom and behavior management including management of time, materials, and space. Additionally, the course examines strategies for managing individual and large-group student behaviors, transitions, lab activities, and other arrangements for classrooms in general and special education. Prerequisite: Admitted to the Teacher Preparation Program.

**ED 435. Secondary Content Pedagogy. 3 Hours.** This course provides students seeking certification in grades 4-8 and 7-12 with pedagogical best-practices. Students will learn lesson planning, assessment, and available resources for their specific content area. Methods for accessing and processing information through traditional as well as new technologies will be addressed. Prerequisite: Admission to the Teacher Preparation Program.

**ED 495. Block 1 - Co-Teaching Practicum for Certification Candidates (EL). 3 Hours.** This course provided clinical experience in the public school setting as part of the field experience requirements for the undergraduate Teacher Preparation Program. The Teacher Candidate is required to spend six hours per week for 12 weeks in an assigned classroom. A university field supervisor in conjunction with the cooperating teacher supervises the Clinical Teacher. Block 1 is the first semester of the co-teaching assignment (2 semesters) in which the Teacher Candidate and Cooperating Teacher are considered co-teachers for the class. Course is graded on a Satisfactory (S) or Unsatisfactory (U) basis for 3 SCH. This course integrates the principles of experiential learning and meets the criterion for internship. Prerequisite: Met admission requirements to undergraduate field based placement guidelines.

**ED 496. Block 2 - Co-Teaching Practicum for Certification Candidates (EL). 3 Hours.** This course provided clinical experience in a public school setting as part of field experience requirements for the undergraduate Teacher Preparation Program. The Teacher Candidate is required to spend 72 complete instructional days in an assigned classroom. A university field supervisor in conjunction with the cooperating teacher supervises the Clinical Teacher. Block 2 is the second semester of the co-teaching

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assignment (2 semesters) in which Teacher Candidate and Cooperating Teacher are co-teachers for the public school class. Course graded on Satisfactory (S) or Unsatisfactory (U) basis for 3 SCH. This course integrates the principals of experiential learning and meets the criterion for internship. Prerequisite: successful completion of [ED 495](#), continued acceptance in the public school classroom, and completion of program requirements.

**ITED 350. Technology and Digital Literacy. 3 Hours.** This course is designed to assist students with developing skills for using web applications and mobile computing. The activities in the course assist students with promoting critical thinking and problem-solving skills by engaging them with digital tools being used in daily life. Topics covered include: technology in society, computers and digital components, the internet- how it works and making the most of web resources, applications for work and play, and systems software- operating systems, utilities and file management, information technology ethics, understanding and assessing hardware, digital devices and media and protection, information technology careers, software programming, databases and information systems, networking and security. There is an emphasis on using the Microsoft Office Suite of Products in this course including Word, Excel, PowerPoint, and Access.

**MATH 2305. Discrete Mathematics. 3 Hours.** This course provides a rigorous study of the concepts and applications of topics designed to prepare math, computer science, and engineering majors for a background in abstraction, notation, and critical thinking for the mathematics most directly related to computer science. Topics include: logic, relations, functions, basic set theory, countability and counting arguments, proof techniques, mathematical induction, combinatorics, discrete probability, recursion, sequence and recurrence, elementary number theory, graph theory, and mathematical proof techniques. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2413](#) with a C or better.

**MATH 2318. Linear Algebra. 3 Hours.** This course provides a rigorous study of the concepts and applications of systems of linear equations, matrices, vector spaces, determinants, eigenvectors, eigenvalues, and linear transformations. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 2320. Differential Equations. 3 Hours.** This course provides a rigorous study of the concepts and applications of first- and second-order ordinary differential equations and systems of ODEs, existence and uniqueness of solutions, initial value problems, the Laplace Transform, compartment models, first- and second-order rate laws, eigenvalues, eigenvectors, and eigenspaces of matrices. This course is taught with a modeling perspective and will utilize applications from areas such as physics, biology, pharmacology, chemistry, ecology, sociology, and electric engineering. Numerical, symbolic and graphing techniques will used to obtain solutions. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 2412. Pre-Calculus. 4 Hours.** This course provides a rigorous study of the concepts and applications of the fundamental topics of calculus including algebraic functions and their graphs, trigonometric functions and identities, polynomial, rational, exponential, and logarithmic functions, solutions to equations and inequalities, analytic geometry, and polar coordinates. This course is designed to prepare STEM majors for success in calculus. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 1314](#) with a C or better or the equivalent preparation

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by STEM department chair permission. Placement will also be determined by the Math Placement Exam score.

**MATH 2413. Calculus I. 4 Hours.** This course provides a rigorous study of the concepts and applications of limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental function, with an application to calculation of areas. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 1314](#) and [MATH 1316](#) with a C or better, or [MATH 2412](#) with a C or better. Placement will also be determined by the Math Placement Exam score.

**MATH 2414. Calculus II. 4 Hours.** This course provides a rigorous study of the concepts and applications of integration, trigonometric functions, sequences and series, indeterminate forms, improper integrals, and elementary differential equations. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2413](#) with a C or better.

**MATH 2415. Calculus III. 4 Hours.** This course provides a rigorous study of the concepts and applications of three dimensional analytic geometry and vectors, differentiation and integration of vector-valued functions and motion in space, arc length and curvature, functions of several variables, partial derivatives, multiple integrals, and integration in vector fields. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 289. Independent Study in Mathematics. 1-4 Hours.** This course provides an option for individualized instruction and research. It may be repeated when topics vary. Prerequisite: Instructor approval.

**MATH 321. College Geometry. 3 Hours.** This course provides a rigorous study of the concepts and applications of the properties of finite geometrics and of points, lines, triangles, and circles in Euclidean geometry. Non-Euclidean geometries will also be studied and contrasted. This course will be taught with a discovery approach in which students scaffold their comprehension through careful axiomatic study. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2413](#) with a C or better.

**MATH 326. Problem Solving for Elementary Teachers. 3 Hours.** This course provides a rigorous study of the concepts of effective problem solving strategies. Strategies will be applied to various problems taken from critical areas of algebra, number concepts, geometry, probability, statistics, measurement, and logic. The scope and sequence will be formative in nature and use a discovery approach to allow students to scaffold their critical thinking skills into a mathematical problem solving rubric. Logical reasoning will be emphasized in all strategies to distinguish the importance of the process of problem solving rather than just finding the answer. Appropriate computer software and hand held technologies will be utilized. With pre-service elementary teachers in mind, this course will also integrate the pedagogy of modeling these skills to elementary mathematics students. Prerequisite: [MATH 1314](#) and [MATH 1350](#) and [MATH 1351](#) with a C or better.

**MATH 330. Math Foundations and Applications. 3 Hours.** This course provides a rigorous study of the foundational concepts that are inherent in upper division mathematics. It is intended to provide a

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transition from the mechanical understanding of lower-level concepts to the abstract nature of upper-level ideas. Students are exposed to a wide range of introductory topics such as set theory, functions/relations, logic, groups, proof-writing, combinatorics, countable/uncountable sets, and elements of advanced calculus. Prerequisite: [MATH 2414](#).

**MATH 334. Introduction to Abstract Algebra. 3 Hours.** This course provides a rigorous study of the concepts and applications of the properties of the integers, permutations, groups, rings, integral domains, and fields. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 357. Probability and Statistics. 3 Hours.** This course provides a rigorous study of the concepts and applications of probability, discrete and continuous distribution, estimation, and hypothesis testing using concepts from calculus. Appropriate computer software and hand held technologies will be utilized. Course is cross-listed with [EE 307](#). Credit cannot be granted for both [MATH 357](#) and [EE 307](#). Prerequisite: [MATH 2414](#) with a C or better.

**MATH 372. Cryptology I. 3 Hours.** This course provides a rigorous study of the introductory concepts and applications of cryptography and various cryptosystems. A familiarity with concepts from discrete mathematics and linear algebra is assumed in the student. Topics include character ciphers, block and stream ciphers, exponentiation ciphers, public key cryptography, knapsack ciphers, and cryptographic protocols/applications. Computer software will be utilized where appropriate. Prerequisite: [MATH 2414](#) and [MATH 2305](#).

**MATH 380. Real Analysis. 3 Hours.** Sets, relations and functions, sequences of real numbers and sequences in  $\mathbb{R}^n$ , continuous and differentiable functions on  $\mathbb{R}^n$ , Riemann Integral. Prerequisites: [MATH 2415](#) and [MATH 2305](#).

**MATH 415. Applied Numerical Analysis. 3 Hours.** This course provides a rigorous study of the concepts and applications of numerical approximation methods for the solution of problems such as systems of linear equations, curve fitting, root finding, differentiation, and integration. This course will have a strong emphasis in the applications of these numerical methods and how to implement them in computer programs using algorithms. Prior experience in a programming language will be useful but not essential and as such appropriate computer software and hand-held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 426. Problem Solving. 3 Hours.** Effective problem solving strategies will be applied to various examples from areas such as algebra, geometry, probability, calculus, trigonometry, number theory, discrete math, linear algebra, and logic. The scope and sequence will be formative in nature and use a discover approach to allow students to scaffold their critical thinking skills into a mathematical problem solving rubric. Logical reasoning will be emphasized in all strategies to distinguish the importance of the process of problem solving rather than just finding the answer. Appropriate computer software and hand held technologies will be utilized. With pre-service math teachers in mind, this course will also focus on the pedagogy of teaching these skills to 7-12 grade mathematics students. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 430. Mathematical Modeling. 3 Hours.** This course provides a rigorous study of the concepts and applications of techniques used to model data related to real-world systems and scenarios from areas

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such as physics, biology, pharmacology, chemistry, ecology, sociology, astronomy, and archeology. Discrete and continuous models, theoretical and empirical models, deterministic and probability models and analytic and simulation models will be considered. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 431. Internship in Mathematics. 3 Hours.** The internship is a work experience that will allow the student to develop skills, gain hands-on business experience, and test career choices and options. The internship will complement and validate the student's academic training.

**MATH 437. Number Theory. 3 Hours.** This course provides a rigorous study of the concepts and applications of the properties of integer representations and operations, analysis and complexity of algorithms, mathematical induction, divisibility, primes and composites, congruences and systems, the Fundamental Theorem of Arithmetic, Pythagorean triples, multiplicative functions, and cryptology. Appropriate computer software and hand held technologies will be utilized. Prerequisite: [MATH 2414](#) with a C or better.

**MATH 450. Combinatorics and Graph Theory. 3 Hours.** This course provides a rigorous study in the topics of combinatorics and graph theory. Topics include principles of counting, graphs, digraphs, Eulerian and Hamiltonian graphs, connectivity, path algorithms, trees, planarity, coloring of graphs, tree searches and sortings, binomial coefficients, generating functions, recurrence relations, and networks flows, and associated algorithms. Appropriate computer software and hand-held technologies will be utilized. Prerequisite: [MATH 2414](#) and [MATH 2305](#).

**MATH 489. Individual Study. 1-3 Hours.** This course provides an option for individualized instruction and research. It may be repeated when topics vary. Prerequisite: Instructor approval.

**MATH 493. Capstone in Mathematics. 3 Hours.** This is the conclusion of preparation of a portfolio of mathematical experiences composed of artifacts from throughout a student's time in upper-level mathematics classes. Presentation of a selected portfolio artifact will be required. Students will be graded on Satisfactory (S) or Unsatisfactory (U) basis. Prerequisite: Senior standing and instructor permission.

**MATH 499. Independent Research. 1-6 Hours.** This is an independent research in Math conducted by a student under the guidance of a faculty member of his or her choice. The student is required to maintain a research journal and submit a project report by the end of the semester and potentially make an oral presentation on the project. SCH and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.

**RDG 343. Reading Beyond the Primary Grades. 3 Hours.** This course teaches content area teachers how to help their students learn from textbooks, including techniques for evaluating both textbooks and students. Coping with the reading, demands of textbooks, and study skills will be learned.

**SPED 410. Introduction to Individual with Exceptionalities. 3 Hours.** This course develops students' foundational knowledge of historical perspectives, educational principles, laws, and professional ethics and roles in the fields of special education and English Language Learners (ELL). It focuses on the learning and behavioral characteristics of diverse learners, including students with exceptionalities (which includes disabilities, Attention Deficit Hyperactivity Disorders, Dyslexia, and Gifted/Talented)

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students who are ELL and students who are Culturally and Linguistically Diverse Exceptional (CLDE) learners. Additionally, this course introduces instructional strategies, appropriate curriculum, accommodations, modifications, and assistive technology to ensure the success of all learners.

**SPED 418. Research, Trends, and Issues in Education. 3 Hours.** This course presents current research, issues, and trends in education, specifically emphasizing the teaching-learning process to meet specific student learning needs. Emphasis is placed on teacher candidates integrating best practices in the teaching-learning process including: 1) Strength-based strategies, 2) Understanding by Design, 3) Differentiation, 4) Differentiation for Neurodiversity, 5) State Accountability Testing, and 6) Teacher Evaluation. Prerequisite: Admission to the Teacher Preparation Program.

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