

## HIGH SCHOOL MATHEMATICS COURSE CODES GRADES 9-12

*High school (grades 9-12) courses in Mathematics require 120 contact hours per credit.*

Course Code	Course Name	Recommended Grade Levels	Description	High School Credit Options*	License/credential Required**
11010	Remedial Math 9-12	9-12	Sets numeration, operations and properties, mathematical sentences, geometry, measurement, graphing and functions, and probability and statistics.	Supplemental instruction – provided as needed	License Code: 11010–Mathematics ♦ 5-12
11029	Mathematics Intervention	9-12	Mathematics Intervention is designed to assist struggling and/or failing students in a mathematics course. This course should be provided in conjunction with the regular mathematics course to pre-teach, re-teach, or provide enrichment to the student to prevent the need to modify the school's existing mathematics curriculum. This course should be a structured class period that will build upon the existing mathematics skills needed for students to achieve the opportunity for success in their current and/or future mathematics courses.	$\frac{1}{2}$ or 1  <i>Max credit = 3</i>	
11030	Prealgebra	9-12	Prealgebra increases students' foundational math skills and prepares them for Algebra I by covering a variety of topics, such as properties of rational numbers (i.e., number theory), ratio, proportion, estimation, exponents and radicals, the rectangular coordinate system, sets and logic, formulas, and solving first-degree equations and inequalities.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	
11031	Algebra I	8 <b>(See note)</b> 9-12	Algebra I includes studying properties and operations of the real number system; evaluating rational algebraic expressions, solving, and graphing first-degree equations and inequalities; translating word problems into equations; operations with and factoring of polynomials; and solving simple quadratic equations.  <b><i>NOTE: Use this course when credit is awarded for the full school year. This course code should only be used for MIS03 reporting purposes when a grade 8 student receives high school credit.</i></b>	1  <i>Max credit = 1</i>	
11032	Algebra II ♦ Recommended Prerequisite: Algebra I	9-12	Algebra II topics typically include field properties and theorems; set theory; operations with rational and irrational expressions; factoring of rational expressions; in-depth study of linear equations and inequalities; quadratic equations; solving systems of linear and quadratic equations; graphing of constant, linear, and quadratic equations; properties of higher degree equations; and operations with rational and irrational exponents. The course may introduce topics in discrete math, elementary probability and statistics; matrices and determinants; and sequences and series.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	
11033	Discrete Mathematics ♦ Recommended Prerequisite: Algebra II	11-12	Discrete Mathematics includes studying topics such as number theory, discrete probability, set theory, symbolic logic, Boolean algebra, combinatorics, recursion, basic algebraic structures, and graph theory.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	

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11034	College Algebra ♦ Recommended Prerequisite: Algebra II	10-12	This course prepares students for eventual work in calculus by covering topics from Algebra and Analytic Geometry. Topics include the study of polynomial, logarithmic, exponential, and rational functions, and their graphs; vectors; set theory; Boolean algebra and symbolic logic; mathematical induction; matrix algebra; sequences and series; limits and continuity; the polar coordinate system; equations and graphs of conic sections; rotations and transformations; and parametric equations.	$\frac{1}{2}$ or 1 Max credit = 1	License Code: 11010–Mathematics ♦ 5-12
11035	Algebra I Semester 1	8 (See note) 9-12	The first part in a multi-part sequence of Algebra I. This course generally covers the same topics as the first semester of Algebra I, including the study of properties of rational numbers (i.e., number theory), ratio, proportion, and estimation, exponents and radicals, the rectangular coordinate system, sets and logic, formulas, and solving first degree equations and inequalities.  <b>NOTE: This course code should only be used for MIS03 reporting purposes when a grade 8 student receives high school credit.</b>	$\frac{1}{2}$ Max credit = $\frac{1}{2}$	
11036	Algebra I Semester 2	8 (See note) 9-12	The second part in a multi-part sequence of Algebra I. This course generally covers the same topics as the second semester of Algebra I, including the study of properties of the real number system and operations, evaluating rational algebraic expressions, solving, and graphing first-degree equations and inequalities, translating word problems into equations, operations with and factoring of polynomials, and solving simple quadratics.  <b>NOTE: This course code should only be used for MIS03 reporting purposes when a grade 8 student receives high school credit.</b>	$\frac{1}{2}$ Max credit = $\frac{1}{2}$	
11037	Linear Algebra ♦ Recommended Prerequisite: Algebra II	11-12	Linear Algebra includes a study of matrices, vectors, tensors, and linear transformations and is typically intended for students who have attained pre-calculus objectives.	$\frac{1}{2}$ or 1 Max credit = 1	
11038	Linear Programming ♦ Recommended Prerequisite: Algebra II	11-12	Linear Programming includes a study of mathematical modeling and the simplex method to solve linear inequalities and is typically intended for students who have attained pre-calculus objectives.	$\frac{1}{2}$ Max credit = $\frac{1}{2}$	

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11039	<p>Abstract Algebra</p> <p>◆ Recommended Prerequisite: Algebra II</p>	11-12	<p>Abstract Algebra includes a study of the properties of the number system from an abstract perspective, including such topics as number fields (i.e., rational, real, and complex numbers), integral domains, rings, groups, polynomials, and the fundamental theorem of algebra. Abstract Algebra is typically geared towards students who have attained pre-calculus objectives.</p>	<p>½ or 1</p> <p>Max credit = 1</p>	<p>License Code: 11000-Mathematics ◆ 5-12</p>
11041	<p>Integrated Mathematics for Computer Science/Information Technology (Mathematics)</p> <p>◆ Recommended Prerequisite: Algebra I and Computer Science Programming</p>	9-12	<p>This course is computer science with a major focus on math. Course topics are divided into six areas: sets, functions, and relations; basic logic; proof techniques; counting basics; graphs and trees; and discrete probability. Mathematical topics are interwoven with computer science applications to enhance the student's understanding of the introduced mathematics while students develop the ability to see computational problems from a mathematical perspective. Topics also include the study of properties and operations of the real number system, evaluating rational algebraic expressions, solving, and graphing first-degree equations and inequalities, translating word problems into equations, operations with and factoring of polynomials, and solving simple quadratic equations. Algorithms in both mathematics and computer science contexts will be explored in depth.</p> <p>Note: This course can be taught for Mathematics credit only. For Computer Science credit, Integrated Mathematics for Computer Science/Information Technology can be found under Computer Science. For Career and Technical Education credit, Integrated Mathematics for Computer Science/Information Technology can be found under Information Technology.</p>	<p>½ or 1</p> <p>Max credit = 1</p>	<p>License Code: 11000-Mathematics ◆ 5-12 <b>AND</b> 23000-Computer Science ◆ 5-12</p>

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11042	Advanced JAVA Programming (Mathematics)	9-12	The Advanced JAVA Programming (Math) course will present concepts similarly covered by Advanced Placement Computer Science and is comparable to an introductory sequence of courses for computer science majors offered in college and university computer science departments. Students completing the course will be able to design and implement computer-based solutions to problems in several application areas; learn, organize, and process well-known algorithms and data structures; be able to develop and select appropriate algorithms and data structures to demonstrate problem-solving; design strategies and methodologies; analyze potential solutions, and understand the ethical and social implications of computing. The course emphasizes object-oriented and imperative problem-solving and design using Java language, representing proven approaches for developing solutions that can scale up from small, simple problems to large, complex ones. Students will be able to code fluently in a well-structured fashion using the programming language JAVA and read and understand a large program and a description of the design and development process leading to such a program.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11051	Integrated Mathematics	9-12	This course formalizes and extends middle school mathematics, deepening students' understanding of linear relationships. The course begins with a review of relationships between quantities, building from unit conversion to a study of expressions, equations, and inequalities. Students contrast linear and exponential relationships, including analyzing sequences and applications such as growth and decay. Students review one-two and multi-step equations, formally reasoning about each step using properties of equality. Students extend this reasoning to systems of linear equations. Students use descriptive statistics to analyze data before focusing on transformations and the relationship between Algebra and Geometry on the coordinate plane.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11052	Integrated Mathematics II  ♦ Recommended Prerequisite: Integrated Mathematics I or Algebra I	9-12	This course begins with a brief exploration of radicals and polynomials before delving into quadratic expressions, equations, and functions, including a derivation of the quadratic formula. Students then embark on a deep study of probability applications and develop advanced reasoning skills by analyzing similarity, congruence, and proofs of mathematical theorems. Students explore right triangles with an introduction to right triangle trigonometry before turning their attention to the geometry of circles and making informal arguments to derive formulas for the volumes of various solids.	½ or 1 <i>Max credit = 1</i>	

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11053	Integrated Mathematics III  ♦ Recommended Prerequisite: Integrated Mathematics II or Algebra I and Geometry -11120	9-12	This course synthesizes previous mathematical learning in four focused areas of instruction. First, students relate visual displays and summary statistics to various data types and probability distributions, focusing on drawing conclusions from the data. Then, students begin an in-depth study of polynomial, rational, and radical functions, drawing on concepts of integers and number properties to understand polynomial operations and the combination of functions through operations. This section of instruction builds on the Fundamental Theorem of Algebra. Students then expand the study of right triangle trigonometry they began in Mathematics II to include non-right triangles and developing the Laws of Sines and Cosines. Finally, students model an array of real-world situations with all the types of functions they have studied, including work with logarithms to solve exponential equations. As they synthesize and generalize what they have learned about a variety of function families, students appreciate the usefulness and relevance of mathematics in the real world.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11061	Calculus  ♦ Recommended Prerequisite: Precalculus or Algebra II and Trigonometry and Geometry or Trigonometry/ Analytic Geometry	11-12	Calculus includes the study of derivatives, differentiation, integration, the definite and indefinite integral, and calculus applications. Typically, students have previously attained knowledge of pre-calculus topics (some combination of trigonometry, elementary functions, analytic geometry, and algebra).	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	
11111	General Mathematics I	9-12	General Math reinforces and expands students' foundational math skills, such as arithmetic operations using rational numbers; area, perimeter, and volume of geometric figures, congruence, and similarity; angle relationships, the Pythagorean theorem, the rectangular coordinate system, sets and logic, ratio and proportion, estimation, formulas, solving and graphing simple equations and inequalities.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	

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11112	Particular Topics in Foundation Math	10-12	This course examines particular topics in Foundation Math, such as arithmetic or basic conceptual skills, rather than providing a general overview.	$\frac{1}{2}$ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11115	Mathematics GED Equivalent	9-12	GED Equivalent Math is intended for students who earn the required credits for graduation by passing the math GED exam, as allowed by NDCC 15.1-21-02.2 (2) and NDCC 15.1-21-02.3 (2). This course is intended for students that are significantly behind in the required credits in math for graduation. This course can be used as either preparation to take the math GED exam for high school credit or to award high school credit upon completion of the math GED exam. This course CANNOT be used as preparation for a GED exam for purposes of obtaining a GED certificate. School board approval is required for schools to award credit for this course.	$\frac{1}{4}$ , $\frac{1}{2}$ , or 1 <i>Max credit = 3</i>	License Code: 11010–Mathematics ♦ 5-12
11118	College Learning Lab – Math 12	11-12	College Learning Lab-Math prepares students for collegiate studies, specifically mathematics. The student will be engaged in educational experiences regarding mathematical methods for solving equations and word problems. The course will refresh students regarding equations, number systems, algebra, geometry, ratio, and analytical reasoning.  NOTE: This course code is designed to be used exclusively with the Pearson MyFoundationsLab platform through the CREAM programs.	$\frac{1}{2}$ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11119	Applied Geometry	9-12	Students will understand the basic facts and properties of points, lines, planes, parallel and perpendicular lines, triangles, polygons (with emphasis on quadrilaterals), circles, and three-dimensional figures. Problem-solving will involve using formulas such as distance, midpoint, slope, area, volume, the Pythagorean Theorem, and trigonometric ratios. Emphasis will be on connecting geometry to real-world situations to solve problems related to algebra, everyday life, navigation, architecture, and art. Concepts will be studied using tools such as a ruler, compass, protractor, calculator, and geometric software.	$\frac{1}{2}$ or 1 <i>Max credit = 1</i>	

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11120	Geometry	9-12	Geometry, emphasizing an abstract, formal approach to the study of geometry, typically includes topics such as properties of plane and solid figures; deductive methods of reasoning and use of logic; geometry as an axiomatic system including the study of postulates, theorems, and formal proofs; concepts of congruence, similarity, parallelism, perpendicularity, and proportion; and rules of angle measurement in triangles.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11121	Analytic Geometry ♦ Recommended Prerequisite: Algebra II and Geometry	11-12	Analytic Geometry courses include the study of the nature and intersection of lines and planes in space, including vectors, the polar coordinate system, equations and graphs of conic sections, rotations and transformations, and parametric equations.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11122	Informal Geometry	10-12	Informal Geometry emphasizes a practical approach to geometry study and deemphasizes an abstract, formal approach. Topics typically include properties of and work with plane and solid figures; inductive methods of reasoning and use of logic; concepts of congruence, similarity, parallelism, perpendicularity, and proportion; and rules of angle measurement in triangles.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11145	Consumer Mathematics	9-12	Consumer Math reinforces general math topics (such as arithmetic using rational numbers, measurement, ratio and proportion, and basic statistics) and applies these skills to consumer problems and situations. Applications typically include budgeting, taxation, credit, banking services, insurance, buying and selling products and services, home and/or car ownership and rental, managing personal income, and investment.	½ or 1 <i>Max credit = 2</i>	License Code: 11010–Mathematics ♦ 5-12
11150	Probability and Statistics ♦ Recommended Prerequisite: Algebra II	11-12	Probability and Statistics introduce the study of likely events and quantitative data analysis, interpretation, and presentation. Course topics generally include basic probability and statistics: discrete probability theory, odds and probabilities, probability trees, populations and samples, frequency tables, measures of central tendency, and presentation of data (including graphs). Course topics may also include normal distribution and measures of variability.	½ or 1 <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12

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11160	Trigonometry ♦ Recommended Prerequisite: Geometry and Algebra II	10-12	Trigonometry prepares students for eventual work in calculus and typically includes the following topics: trigonometric and circular functions; their inverses and graphs; relations among the parts of a triangle; trigonometric identities and equations; solutions of right and oblique triangles; and complex numbers.	$\frac{1}{4}$ , $\frac{1}{2}$ , or 1  <i>Max credit = 1</i>	
11161	Trigonometry/ Analytic Geometry ♦ Recommended Prerequisite: Geometry and Algebra II	11-12	This course prepares students for eventual work in calculus by covering Trigonometry and Analytic Geometry topics. Topics typically include the study of right trigonometric and circular functions, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; complex numbers; numerical tables; vectors; the polar coordinate system; equations and graphs of conic sections; rotations and transformations; and parametric equations.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11162	Geometry/ Trigonometry/ Advanced Algebra ♦ Recommended Prerequisite: Geometry and Algebra I	11-12	Geometry/Trigonometry/Advanced Algebra reviews and extends algebra and geometry concepts for students who have already taken Algebra I and Geometry. This course includes a review of such topics as properties and operations of real numbers; evaluation of rational algebraic expressions; solutions and graphs of first-degree equations and inequalities; translation of word problems into equations; operations with and factoring of polynomials; simple quadratics; properties of plane and solid figures; rules of congruence and similarity; coordinate geometry including lines, segments, and circles in the coordinate plane; and angle measurement in triangles including trigonometric ratios.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	



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11170	STEM Seminar (Math)	9-12	<p>STEM Seminar provides students with a project-based, integrated, holistic experience with Science, Technology, Engineering, and Math. Taught by an interdisciplinary team of teachers, the course demonstrates the blurring of content areas when solving an authentic problem. It focuses on engaging students in hands-on, interdisciplinary application of the Engineering Design Process. Students engage in authentic projects, create products and presentations, and network with local STEM industry experts. In this course, students uncover and acquire a cohesive set of concepts, competencies, and dispositions of science, technology, engineering, and mathematics that they transfer and apply in both academic and real-world contexts to be globally competitive in the 21<sup>st</sup> Century. This course curriculum infuses educational content from Math, Science, Language Arts, and Social Studies. It utilizes state standards and technical skills and develops 21<sup>st</sup> Century Skills such as communication, networking, collaboration, decision-making, creativity, and critical thinking.</p> <p><b>Note: This course can be taught for Mathematics credit only. For Technology and Engineering credit, use STEM Seminar (Tech-Ed) under Technology and Engineering. For Science credit, use STEM Seminar (Science) under Science.</b></p> <p><b>Note: Only one (1) credit of this course can be used towards the coordinated plan of study for the Academic and Career and Technical Education Scholarship.</b></p>	<p>½ or 1 <i>Max credit = 2</i></p>	<p>License Code: 11010–Mathematics ♦ 5-12</p>
11181	<p>Precalculus</p> <p>♦ Recommended Prerequisite: Algebra II <b>and</b> Geometry <b>or</b> Geometry/ Trigonometry/ Advanced Algebra</p>	11-12	<p>Precalculus combines the study of Trigonometry, Elementary Functions, Analytic Geometry, and Algebra topics as preparation for calculus. Topics typically include the study of complex numbers; polynomial, logarithmic, exponential, rational, right trigonometric, and circular functions and their relations, inverses, and graphs; trigonometric identities and equations; solutions of right and oblique triangles; vectors; the polar coordinate system; conic sections; Boolean algebra and symbolic logic; mathematical induction; matrix algebra; sequences and series; and limits and continuity.</p>	<p>½ or 1 <i>Max credit = 1</i></p>	<p>License Code: 11010–Mathematics ♦ 5-12</p>

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11190	Applied Mathematics ♦ Recommended Prerequisite: General Mathematics	9-12	Applied Mathematics is designed to help students develop and refine job-related math skills. Units focus on arithmetic operations, problem-solving techniques, estimation of answers, measurement skills, algebra, geometry, data handling, statistics, and computers. Emphasis is on the ability to apply functional mathematics to solve problems in the world of work.	½ or 1 Max credit = 1	License Code: 11010–Mathematics ♦ 5-12
11191	Occupationally Applied Math	9-12	Occupationally Applied Math reinforces general math skills, extends these skills to include some prealgebra and algebra topics, and uses these skills primarily in occupational applications. Course topics typically include rational numbers, measurement, basic statistics, ratio and proportion, basic geometry, formulas, and simple equations.	½ or 1 Max credit = 1	
11579	AP Precalculus ♦ Prerequisites: Algebra II and Geometry	11-12	The AP Precalculus course is equivalent to a one-semester, college precalculus course. This course will build upon the skills, and concepts students have learned in Algebra II. It will help prepare students for the skills and concepts needed for Calculus. The course focuses on polynomial and rational functions, exponential and logarithmic functions, trigonometric and polar functions, and parameters, vectors, and matrices. The course analyzes scenarios, conditions, and data sets to determine and validate appropriate function models. It explores graphic, numeric, verbal, and analytical representations of problems. This course symbolically manipulates different function types in the coordinate system and builds functions reflecting changes in variables. See attached for a more detailed description of course content and prerequisite knowledge and skills.	½ or 1 Max credit = 1	
11580	Advanced Placement Statistics© Recommended Prerequisite: Algebra II	10-12	The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics. The course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes in the AP Statistics course: exploring data, sampling, and experimentations, anticipating patterns, and statistical inference. Students use technology, investigations, problem-solving, and writing to build conceptual understanding.	½ or 1 Max credit = 1	

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11581	Advanced Placement Calculus AB© ♦ Recommended Prerequisite: Algebra II	10-12	The AP Calculus AB is roughly equivalent to a first-semester college calculus course devoted to topics in differential and integral calculus. The AP course covers topics in these areas, including concepts and skills of limits, derivatives, definite integrals, and the Fundamental Theorem of Calculus. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally and to make connections among these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12
11582	Advanced Placement Calculus BC© ♦ Recommended Prerequisite: Algebra II	10-12	The AP Calculus BC is roughly equivalent to both first and second-semester college calculus courses and extends the content learned in AB to different types of equations and introduces the topic of sequences and series. The AP course covers differential and integral calculus topics, including concepts and skills of limits, derivatives, definite integrals, the Fundamental Theorem of Calculus, and series. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally and to make connections among these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions.	$\frac{1}{2}$ or 1  <i>Max credit = 1</i>	License Code: 11010–Mathematics ♦ 5-12

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11583	<p>Advanced Placement Computer Science A© (Mathematics)</p> <p>♦ Recommended Prerequisite: Algebra I and Computer Science Programming</p>	10-12	<p>AP Computer Science A is equivalent to a first-semester, college-level course in computer science. The course introduces students to computer science with fundamental topics that include problem-solving, design strategies and methodologies, organization of data (data structures), approaches to processing data (algorithms), analysis of potential solutions, and the ethical and social implications of computing. The course emphasizes both object-oriented and imperative problem-solving and design using Java language. These techniques represent proven approaches for developing solutions that can scale from small, simple problems to large, complex ones. The AP Computer Science A course curriculum is compatible with many CS1 courses in colleges and universities.</p> <p>Note: This course can be taught for Mathematics credit only. For Computer Science credit, Advanced Placement Computer Science A© can be found under Computer Science.</p>	<p>½ or 1</p> <p>Max credit = 1</p>	<p>License Code:</p> <p>11000-Mathematics ♦ 5-12 <b>AND</b> 23000-Computer Science ♦ 5-12</p>

\* High school curricular requirements are spelled out in NDCC 15.1-21-02. Maximum credit refers to the maximum units of credit a student may earn for a course over four years of high school. (Example: Band - a student may be enrolled in band all four years of high school -- earning a possible total of four units of credit.)

\*\* Please refer to the second page of the teacher's North Dakota Educator's Professional license to verify which subject areas a teacher is qualified to teach. Licenses and endorsements are obtained on a teaching license from the Education Standards and Practices Board (ESPB). Credentials are obtained from the Department of Public Instruction (DPI) and issued to individuals with a teaching license.