



MATHEMATICS

Graduation Requirement Guidance 2016 – 2017

Mathematics Graduation Requirement Guidance
2016 - 2017

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Executive Summary

Successful preparation for both postsecondary education and employment requires learning the same rigorous mathematics content and skills. No longer do students planning to enter the workplace after high school need a different and less rigorous mathematics curriculum than those planning to go to college. (Achieve, Inc., 2004)

In 2007, Georgia's State Board of Education adopted rigorous new graduation requirements effective with the ninth grade class of 2008. A hallmark of the rule was the elimination of tiered-diploma options where students followed either College Preparatory or Technology/Career coursework. All students are expected to complete a common set of mathematics requirements to earn a regular diploma. The rule specifies certain mathematics courses that all students must take – making rigorous content an expectation for all and not just for some of Georgia's students and ensuring that all students are given the opportunity to choose mathematics courses that could include Advanced Placement, International Baccalaureate, and dual enrollment courses. Additionally, the rule encourages active student involvement in selecting mathematics courses based on the students' areas of interest.

The Georgia State Board of Education's 2015 adoption of the Georgia Standards of Excellence (GSE) in mathematics was a significant step toward ensuring that Georgia's K-12 students are prepared to enter the 21st century global workplace. **The Standards are intended to be a living work; so as new and better evidence emerges, the Standards will be revised accordingly.** As a natural outgrowth of meeting the charge to define college and career readiness, the Standards define what students should understand and be able to do in their study of mathematics. Georgia's mathematics standards are called Georgia Standards of Excellence for Mathematics (MGSE) and were fully implemented in Kindergarten – High School classrooms in school year 2015-2016.

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The Standards for *Mathematical Practice* represent the habits and attitudes of mathematical thinkers and are integral to the superstructure of GSE mathematics. The practice standards define the way knowledge comes together and is used by students. The Standards *for Mathematical Practice* describe the expertise that mathematics educators at all levels should seek to develop in their students. The practices are as follows:

- Make sense of problems and persevere in solving them;
- Reason abstractly and quantitatively;
- Construct viable arguments and critique the reasoning of others;
- Model with mathematics;
- Use appropriate tools strategically;
- Attend to precision;
- Look for and make use of structure;
- Look for and express regularity in repeated reasoning.

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The Standards *for Mathematical Content* offer a balanced combination of procedure and understanding.

A lack of understanding effectively prevents a student from engaging in the mathematical practices. Designers of curriculum, assessment, and professional development should all attend to the need to connect mathematical practice to mathematical content in mathematics instruction.

Mathematics requirements associated with the graduation rule are currently aligned with the Georgia Standards of Excellence (GSE) for mathematics. A wide range of mathematics courses provide opportunities for students to continue advanced coursework, to take advantage of academic support classes, and to choose special interest courses, depending on individual needs and aspirations. An increased number of students with disabilities now have the opportunity to earn a regular education diploma, thus enabling them to become employed or to go on to postsecondary education. The mathematics graduation requirements associated with the graduation rule, along with state curriculum standards and assessments, will ensure that more students finish school ready to thrive in our knowledge-based, high-skills economy.

Key Feature of the State Board of Education Rule 160-4-2-.48 Requirements

Four units of core credit in mathematics, including Coordinate Algebra or Algebra I or the equivalent; Analytic Geometry or Geometry or the equivalent; and Advanced Algebra or Algebra II or the equivalent. Additional core courses needed to complete four credits in mathematics must be chosen from the list of GSE/AP/IB/dual enrollment designated courses.

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Section 1: Georgia HS Graduation Requirements

Four units of credit in mathematics shall be required of all students, to include:

- Coordinate Algebra or Algebra I or the equivalent,
- Analytic Geometry or Geometry or the equivalent,
- Advanced Algebra or Algebra II or the equivalent, and
- One Additional Unit to be selected from the list of GSE/AP/IB/dual enrollment designated courses.

NOTE: Accelerated Coordinate Algebra/Analytic Geometry A and Accelerated Analytic Geometry B/Advanced Algebra include the standards of Coordinate Algebra, Analytic Geometry, and Advanced Algebra. At the present time, these are the only equivalent courses for Coordinate Algebra, Analytic Geometry, and Advanced Algebra. Accelerated Algebra I/Geometry A and Accelerated Geometry B/Algebra II include the standards of Algebra I, Geometry, and Algebra II. At the present time, these are the only equivalent courses for Algebra I, Geometry, and Algebra II.

NOTE: Students who complete the alternative sequence Coordinate Algebra + Analytic Geometry + Pre-Calculus + a fourth mathematics course beyond Pre-Calculus have met the mathematics graduation requirement.

Students with disabilities who earn credit in Coordinate Algebra or Algebra I or the equivalent, along with the associated support course, *and* Analytic Geometry or Geometry or the equivalent, along with the associated support course, may upon the determination through the Individualized Education Program Team meet the mathematics diploma requirements by completing Advanced Algebra or Algebra II or the equivalent, for a total of 3 mathematics core credits. Successful completion of 3 core units of mathematics may not meet the mathematics admission requirements for entrance into a University System of Georgia institution or other post-secondary institution without additional course work.

Students with disabilities who were identified prior to enrollment in high school and have a disability affecting mathematics achievement may follow an alternative course sequence to meet the mathematics course requirements of the graduation rule 160-4-2-.48. The alternate course sequences include:

- 1) enrollment in a single advanced mathematics course and receiving instruction over two years or
- 2) dispensation from completing Advanced Algebra or Algebra II.

These alternative course sequences would allow a student with disabilities earning core credit in Coordinate Algebra or Algebra I and Analytic Geometry or Geometry, along with two other mathematics courses, to satisfy the minimum mathematics requirements for high school graduation. For further detail, please see Guidelines for Georgia State Board of Education Rule 160-5-1-.15 AWARDING UNITS OF CREDIT AND ACCEPTANCE OF TRANSFER CREDIT AND/OR GRADES section 2(e).

High school credit for mathematics courses taken in middle school should be awarded only for courses that include concepts and skills based on the GSE in Mathematics for grades 9-12 or those approved by the State Board of Education. All course requirements, including associated End of Course requirements, must be met prior to granting credit.

High School credit is **not** awarded for courses that address concepts and skills associated with grades K-8.

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Entered Ninth Grade in 2011-2012	Entered Ninth Grade in 2012-2013 and Subsequent Years
Graduation Rule 160-4-2-.48	Awarding Units of Credit Rule 160-5-1-.15
4 units of core credit in mathematics	4 units of core credit in mathematics
○ 1 unit in Mathematics I or the equivalent	○ 1 unit in Coordinate Algebra or Algebra I or the equivalent
○ 1 unit in Mathematics II or the equivalent	○ 1 unit in Analytic Geometry or Geometry or the equivalent
○ 1 unit in Mathematics III or the equivalent	○ 1 unit in Advanced Algebra or Algebra II or the equivalent
○ Support courses are designated as elective courses	○ Support courses are designated as elective courses
○ Additional core mathematics credits must be chosen from the list of GPS/CCGPS/AP/IB/dual enrollment designated courses	○ Additional core mathematics credits must be chosen from the list of GSE/AP/IB/dual enrollment designated courses
<p>Students with Disabilities who earn credit in GPS Mathematics I or the equivalent, along with the associated support course, <i>and</i> GPS Mathematics II or the equivalent, along with the associated support course, may upon determination of the Individualized Education Program Team meet the mathematics diploma requirements by completing GPS Mathematics III or the equivalent, for a total of 3 mathematics core credits.</p>	<p>Students with Disabilities who earn credit in Coordinate Algebra or Algebra I or the equivalent, along with the associated support course, <i>and</i> Analytic Geometry or Geometry or the equivalent, along with the associated support course, may upon determination of the Individualized Education Program Team meet the mathematics diploma requirements by completing Advanced Algebra or Algebra II or the equivalent, for a total of 3 mathematics core credits.</p>
<p>Students with Disabilities, who were identified prior to enrollment in high school and have a disability affecting mathematics achievement, may follow an alternative course sequence to meet the mathematics course requirements of the graduation rule 160-4-2-.48. The alternative course sequences include 1) students enrolling in a single advanced mathematics course and receiving instruction over two years or 2) receiving dispensation from completing Mathematics III. These alternative course sequences would allow a student with disabilities earning core credit in Mathematics I and II with two other mathematics courses to satisfy the minimum mathematics requirements for high school graduation.</p>	<p>Students with Disabilities, who were identified prior to enrollment in high school and have a disability affecting mathematics achievement, may follow an alternative course sequence to meet the mathematics course requirements of the graduation rule 160-4-2-.48. The alternative course sequences include 1) students enrolling in a single advanced mathematics course and receiving instruction over two years or 2) receiving dispensation from completing Advanced Algebra or Algebra II. These alternative course sequences would allow a student with disabilities earning core credit in Coordinate Algebra or Algebra I and Analytic Geometry or Geometry with two other mathematics courses to satisfy the minimum mathematics requirements for high school graduation.</p>

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Section 2: Mathematics Course Sequence Information

Mathematics Sequence Options for Grades 6 - 12						
GRADE	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
				Advanced	Accelerated	Accelerated
6	Grade 6	Grade 6	Grade 6	Grade 6 Advanced	Grade 6-8 Advanced	Grade 6-8 Advanced
7	Grade 7	Grade 7	Grade 7	Grade 7 Advanced		
8	Grade 8	Grade 8	Grade 8	Grade 8 Advanced	Coordinate Algebra OR Algebra I	Accelerated Coordinate Algebra/Analytic Geometry A OR Accelerated Algebra I/Geometry A
9	Foundations of Algebra	Coordinate Algebra OR Algebra I	Accelerated Coordinate Algebra/Analytic Geometry A OR Accelerated Algebra I/Geometry A	Accelerated Coordinate Algebra/Analytic Geometry A OR Accelerated Algebra I/Geometry A	Analytic Geometry OR Geometry	Accelerated Analytic Geometry B/Advanced Algebra OR Accelerated Geometry B/Algebra II
10	Coordinate Algebra OR Algebra I	Analytic Geometry OR Geometry	Accelerated Analytic Geometry B/Advanced Algebra OR Accelerated Geometry B/Algebra II	Accelerated Analytic Geometry B/Advanced Algebra OR Accelerated Geometry B/Algebra II	Advanced Algebra OR Algebra II	Accelerated Pre-Calculus
11	Analytic Geometry OR Geometry	Advanced Algebra OR Algebra II	Accelerated Pre-Calculus	Accelerated Pre-Calculus	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses
12	Advanced Algebra OR Algebra II	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses	Fourth Mathematics Course Options*; IB Courses**; Dual Enrollment Courses

* Fourth Mathematics Course Options are listed in Chart A on page 8.

**International Baccalaureate Course Sequences are provided in Chart B on page 9.

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CHART A: Fourth Mathematics Course Options

	Fourth Mathematics Course	Suggested Prerequisite Courses
27.04810	Foundations of Algebra	Mathematics Grade 8
27.09740	Pre- Calculus	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.08500	Advanced Mathematical Decision Making (AMDM)	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.08800	Statistical Reasoning	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.08600	Mathematics of Industry and Government (MIG)	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.08900	College Readiness Mathematics	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra
27.08700	Mathematics of Finance (MOF)	LEA Flexibility
27.07800	Calculus	Algebra I + Geometry + Algebra II + Pre-Calculus OR Coordinate Algebra + Analytic Geometry + Advanced Algebra + Pre-Calculus Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II + Accelerated Pre-Calculus OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra + Accelerated Pre-Calculus
27.07400	AP Statistics	Algebra I + Geometry + Algebra II OR Coordinate Algebra + Analytic Geometry + Advanced Algebra Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra
27.07200	AP Calculus AB	Algebra I + Geometry + Algebra II + Pre-Calculus OR Coordinate Algebra + Analytic Geometry + Advanced Algebra + Pre-Calculus Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II + Accelerated Pre-Calculus OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra + Accelerated Pre-Calculus
27.07300	AP Calculus BC	Accelerated Algebra I/Geometry A + Accelerated Geometry B/Algebra II + Accelerated Pre-Calculus OR Accelerated Coordinate Algebra/Analytic Geometry A + Accelerated Analytic Geometry B/ Advanced Algebra + Accelerated Pre-Calculus
27.05200	History of Mathematics	AP Calculus AB or BC (may be taken concurrently with AP Calculus); 0.5 elective credit only
27.07700	Multivariable Calculus	AP Calculus BC
27.08000	Engineering Calculus	AP Calculus BC
27.07900	Advanced Mathematical Topics	AP Calculus AB or BC

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CHART B: International Baccalaureate Mathematics Course Sequences

Grade	Option 1	Option 2		Option 3	Option 4	Option 5	Option 6
						MS Acceleration	MS Acceleration
6	Grade 6	Grade 6		Grade 6	Grade 6	Grades 6-8	Grades 6-8
7	Grade 7	Grade 7		Grade 7	Grade 7		
8	Grade 8	Grade 8		Grade 8	Grade 8	Algebra I OR Coordinate Algebra	Accelerated Algebra I /Geometry A OR Coordinate Algebra/Analytic Geometry A
9	Algebra I OR Coordinate Algebra	Algebra I OR Coordinate Algebra		Accelerated Algebra I /Geometry A OR Coordinate Algebra/Analytic Geometry A	Accelerated Algebra I /Geometry A OR Coordinate Algebra/Analytic Geometry A	Geometry OR Analytic Geometry	Accelerated Geometry B/ Algebra II OR Accelerated Analytic Geometry B/Advanced Algebra
10	Geometry OR Analytic Geometry	Geometry OR Analytic Geometry		Accelerated Geometry B/ Algebra II OR Accelerated Analytic Geometry B/ Advanced Algebra	Accelerated Geometry B/ Algebra II OR Accelerated Analytic Geometry B/ Advanced Algebra	Algebra II OR Advanced Algebra	Accelerated Pre-Calculus OR IB Mathematical Studies – Year 1*
11	Algebra II OR Advanced Algebra	Algebra II OR Advanced Algebra Block	Pre-Calculus OR IB Mathematical Studies - Year 1* Block	Accelerated Pre-Calculus OR IB Mathematical Studies – Year 1*	Accelerated Pre-Calculus OR IB Mathematical Studies – Year 1*	IB Mathematical Studies – Year 1*	IB Mathematics – Year 1* OR AP Calculus AB
12	IB Mathematical Studies – Year 1	IB Mathematics – Year 1 OR IB Mathematical Studies – Year 2		IB Mathematics – Year 1 OR IB Mathematical Studies – Year 2	IB Mathematics – Year 2 OR AP Calculus AB/BC AP Statistics	IB Mathematics – Year 1 OR IB Mathematical Studies – Year 2	IB Mathematics – Year 2 OR AP Calculus AB/BC AP Statistics

**After students meet the diploma requirements for IB Standard Level, additional choices for the fourth year could include Advanced Mathematical Decision Making, Mathematics of Industry and Government, Mathematics of Finance, Statistical Reasoning, AP Statistics, and AP Calculus AB/BC.*

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Move On When Ready (MOWR) Mathematics Dual Enrollment Program

Effective 2016-2017, MOWR mathematics courses have been provided unique course codes and titles which demonstrate the college level course and the institution where the courses were completed. For additional clarification, a MOWR Mathematics Frequently Asked Questions document can be found at <https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Pages/Mathematics.aspx>.

High school students are prepared for college level degree courses after mastering the college readiness standards associated with Advanced Algebra or Algebra II. For that reason, all approved MOWR mathematics courses provide options for meeting the fourth course beyond Advanced Algebra/Algebra II graduation requirement. Very talented mathematics students who choose the alternative mathematics course sequence Coordinate Algebra + Analytic Geometry + Pre-Calculus or MOWR Pre-Calculus are prepared for college level courses beyond Pre-Calculus.

NOTES: Accelerated Coordinate Algebra/Analytic Geometry A and Accelerated Analytic Geometry B/Advanced Algebra include the standards of Coordinate Algebra, Analytic Geometry, and Advanced Algebra. At the present time, these are the only equivalent courses for Coordinate Algebra, Analytic Geometry, and Advanced Algebra.

Accelerated Algebra I/Geometry A and Accelerated Geometry B/Algebra II include the standards of Algebra I, Geometry, and Algebra II. At the present time, these are the only equivalent courses for Algebra I, Geometry, and Algebra II.

Neither the Georgia High School Graduation Rule, nor policy established by the Technical College System of Georgia or the University System of Georgia, endorses MOWR College Algebra as an equivalent of Advanced Algebra/Algebra II.

In rare instances, very talented mathematics students will choose the alternative mathematics course sequence Coordinate Algebra/Algebra I + Analytic Geometry/Geometry + Pre-Calculus or MOWR Pre-Calculus and will have mastered the GSE mathematics standards associated with Advanced Algebra/Algebra II within the Pre-Calculus course. In this case, while Pre-Calculus is not an equivalent course for Advanced Algebra/Algebra II, the Advanced Algebra/Algebra II graduation requirement has been met with an expectation of enrollment in higher-level courses beyond Pre-Calculus.

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Section 3: High School Mathematics Course Descriptions

Georgia Mathematics

Georgia Mathematics focuses on actively engaging the student in the development of mathematical understanding by working independently and cooperatively to solve problems, estimating and computing efficiently, using appropriate tools, concrete models, and a variety of representations, and conducting investigations and recording findings. There is a shift toward applying mathematical concepts and skills in the context of authentic problems and student understanding of concepts rather than merely following a sequence of procedures. In mathematics classrooms, students will learn to think critically in a mathematical way with an understanding that there are many different solution pathways and sometimes more than one right answer in applied mathematics. Mathematics is the economy of information. The central idea of all mathematics is to discover how knowing some things leads, via reasoning, to knowing more—without having to commit the information to memory as a separate fact. It is the reasoned, logical connections that make mathematics manageable. The implementation of the Georgia Standards of Excellence in Mathematics places the expected emphasis on sense-making, problem solving, reasoning, representation, modeling, representation, connections, and communication.

High School Mathematics

Foundations of Algebra is a first year high school mathematics course option for students who have completed mathematics in grades 6 – 8 yet will need substantial support to bolster success in high school mathematics. The course is aimed at students who have reported low standardized test performance in prior grades and/or have demonstrated significant difficulties in previous mathematics classes.

Algebra I is the first course in a sequence of three required high school courses designed to ensure career and college readiness. The course represents a discrete study of algebra with correlated statistics applications.

Coordinate Algebra is the first course in a sequence of three high school courses designed to ensure career and college readiness. The course represents a discrete study of algebra with correlated statistics applications and a bridge to the second course through coordinate geometric topics.

Geometry is the second course in a sequence of three required high school courses designed to ensure career and college readiness. The course represents a discrete study of geometry with correlated statistics applications.

Analytic Geometry is the second course in a sequence of three high school courses designed to ensure career and college readiness. The course embodies a discrete study of geometry analyzed by means of algebraic operations with correlated probability/statistics applications and a bridge to the third course through algebraic topics.

Algebra II/ Advanced Algebra is the third course in a sequence of three high school courses designed to ensure career and college readiness. It is designed to prepare students for fourth course options relevant to their career pursuits.

Accelerated Algebra I/ Geometry A is the first course in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school tenure, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics

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Accelerated Coordinate Algebra/Analytic Geometry A is the first course in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school tenure, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics.

Accelerated Geometry B/Algebra II is the second course in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school tenure, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics.

Accelerated Analytic Geometry B/Advanced Algebra is the second course in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school tenure, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics.

Accelerated Pre-Calculus is a the third course mathematics in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school tenure, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics.

Pre-Calculus is a fourth mathematics course option designed to follow the completion of Algebra II, Advanced Algebra, Accelerated Geometry B/Algebra II, or Accelerated Analytic Geometry B/Advanced Algebra, which prepares students for calculus and other higher-level mathematics courses.

Advanced Mathematical Decision Making is a fourth course option designed to follow the completion of Algebra II, Advanced Algebra, Accelerated Geometry B/Algebra II, or Accelerated Analytic Geometry B/Advanced Algebra, which offers further experiences with statistical information and summaries, methods of designing and conducting statistical studies, data modeling, basic financial decisions, and network models for making informed decisions.

Mathematics of Industry and Government is a fourth course option designed to follow the completion of Algebra II, Advanced Algebra, Accelerated Geometry B/Algebra II, or Accelerated Analytic Geometry B/Advanced Algebra, which focuses on the development of mathematical models that can be used to model, improve, predict, and optimize real-world systems. These mathematical models include both deterministic models such as mathematical programming, routing, or network flows, and probabilistic models such as queuing, and simulation.

Mathematics of Finance is a fourth course option which concentrates on the mathematics necessary to understand and make informed decisions related to personal finance. The mathematics in the course is based on many topics in prior courses; however, the specific applications will extend the student's understanding of when and how to use these topics.

Statistical Reasoning is a fourth mathematics course option for students who have completed Algebra II, Advanced Algebra, Accelerated Geometry B/Algebra II, or Accelerated Analytic Geometry B/Advanced Algebra, which offers opportunities to strengthen the understanding of the statistical method of inquiry and statistical simulations.

College Readiness Mathematics is a fourth mathematics course option for students who have completed Algebra II or Advanced Algebra, but are still struggling with high school mathematics standards essential for success in first year post-secondary mathematics courses required for non-STEM majors. The course is designed to serve as a bridge for high school students who will enroll in non-STEM post-secondary study.

Calculus is a fourth mathematics course option for students who have completed Pre-Calculus or Accelerated Pre-Calculus. The course includes problem solving, reasoning and estimation, functions, derivatives, application of the derivative, integrals, and application of the integral.

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Advanced Mathematical Topics is a mathematics option for students who have completed AP Calculus AB or AP Calculus BC. The course offers an introduction to advanced mathematical topics including logic and set theory, combinatorics, differential equations, and mathematical proofs, to be presented through an abstract approach which characterizes upper level mathematics courses.

Multivariable Calculus is a mathematics option for students who have completed AP Calculus BC. It includes three-dimensional coordinate geometry; matrices and determinants; eigenvalues and eigenvectors of matrices; limits and continuity of functions with two independent variables; partial differentiation; multiple integration; the gradient; the divergence; the curl; Theorems of Green, Stokes, and Gauss; line integrals; integrals independent of path; and linear first-order differential equations.

Engineering Calculus is a mathematics option for students who have completed AP Calculus BC. The course provides students with opportunities to develop an understanding of multivariable calculus as it applies to engineering systems, the history of engineering, and its contributions to society. The course includes three-dimensional coordinate geometry; matrices and determinants; limits and continuity of functions with two independent variables; partial differentiation; multiple integration; the gradient; the divergence; the curl; Theorems of Green, Stokes, and Gauss; line integrals; integrals independent of path; and linear first-order differential equations.

History of Mathematics is a one-semester **elective** course option for students who have completed AP Calculus or are taking AP Calculus concurrently. It traces the development of major branches of mathematics throughout history, specifically algebra, geometry, number theory, and methods of proofs, how the needs of various cultures influenced that development, and how the mathematics, in turn, influenced culture. The course extends the numbers and counting, algebra, geometry, and data analysis and probability strands from previous courses, and includes a new history strand.

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Section 4: Student Placement

Student Placement for Students Entering Ninth Grade from a Georgia School

Determination of course placement should depend on the student's interest in mathematics and/or related fields of study and on the student's achievement in mathematics.

Students who have successfully completed mathematics in grades 6 – 8 have mastered the content necessary to be successful in **Algebra I or Coordinate Algebra**.

The Georgia mathematics program of study provides the opportunity for students with an interest and desire to study mathematics to challenge themselves by taking the more rigorous courses **Accelerated Algebra I/Geometry A** or **Accelerated Coordinate Algebra/Analytic Geometry A**. Given the alignment of the standards, students who have difficulty in the accelerated mathematics sequence will be able to transition easily to the regular mathematics sequence. As the pace and rigor of accelerated mathematics courses is significantly more challenging than that of the regular mathematics sequence, students placed in an accelerated mathematics course should have strong mathematical skills and an interest in pursuing Advanced Placement or other higher-level mathematics courses while still in high school. Schools should consider equity and access for all when assigning students to the accelerated mathematics sequence of courses.

Students who will require **additional** support for success in Algebra I or Coordinate Algebra are best served through placement in **Algebra I or Coordinate Algebra Support** concurrent with enrollment in Algebra I or Coordinate Algebra. Students should be enrolled in mathematics support courses based on local system criteria for identifying students who are at risk for failing mathematics. Students who are *placed* in high school and have not passed the grade 8 math state assessment should certainly be afforded the benefit of a support course. Other criteria might include teacher recommendation based on student performance in the previous or current mathematics course, prior retention, a failing grade in a mathematics course, and/or low scores on the mathematics component of the state assessment or other instruments used by the system to predict success.

Students who have completed mathematics in grades 6 – 8 yet will need **substantial** support to bolster success in high school mathematics should be considered for enrollment in the **Foundations of Algebra** course prior to enrollment in Algebra I or Coordinate Algebra.

The local school or system will determine the criteria for placing students in appropriate mathematics courses.

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Placement Decision Considerations

- Placement in high school mathematics courses is dependent upon assessment of student knowledge from the transfer school.
- Students should be evaluated by a mathematics instructor with a thorough understanding of the content.
- After using the identified strengths to place the student in the appropriate course, identified weaknesses should be addressed through supplementary lessons that emphasize pre-requisite content knowledge. These lessons can be delivered through the mathematics support courses or through independent work.
- Students needing extensive remediation on middle grades topics should be considered for placement in **Foundations of Algebra**.
- Students requiring additional support for success in high school mathematics courses are best served through placement in **support courses concurrent with core course enrollment**.
- Students who exit high school having completed sequences through Algebra II or Advanced Algebra may have limited post-secondary options. Parents should be thoroughly advised of the consequences of their student graduating with only Algebra I through Algebra II credit or Coordinate Algebra through Advanced Algebra credit.
- During the advisement session, fourth year mathematics options should be discussed and clarified, and opportunities including summer courses, virtual courses, and other available resources explained.
- Students who will pursue post- secondary non-STEM study and have completed Algebra II or Advanced Algebra, but are still struggling with high school standards essential for success in in first year post-secondary mathematics courses required for non-STEM majors, should be considered for enrollment in **College Readiness Mathematics** to meet the fourth mathematics core course graduation requirement.

Student Placement for Students Transferring into Georgia Schools from Out-of-State Schools

Because the *content* of courses with similar names can vary significantly, it is crucial that the transcripts of students entering Georgia high schools from other states or countries with existing credit in high school mathematics courses be examined and that the students' mathematics proficiency be assessed. In every case, students' transcripts should be carefully evaluated and compared to Georgia course content; placement assessments are appropriate as needed. Students' interest and levels of achievement (grades) should also be considered when making a placement decision.

Transfer Credit

Existing mathematics credits granted by out-of-state schools must be transferred as mathematics credit. Pursuant to State Board of Education Rule 160-5-1-.15 section (2)(a), "Local boards of education shall accept student course credit earned in an accredited school." In paragraph (2)(a)1, "A local board of education shall not substitute courses and exempt students from the required secondary minimum core curriculum...unless the student transferred from an accredited secondary school...". State Board of Education Rule 160-5-1-.15 AWARDING UNITS OF CREDIT AND ACCEPTANCE OF TRANSFER CREDIT AND/OR GRADES can be found at:

<http://www.gadoe.org/External-Affairs-and-Policy/State-Board-of-Education/SBOE%20Rules/160-5-1-.15.pdf>

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Military Transfer Law

In 2009, O.C.G.A. § 20-2-2130 through 20-2-2170 which pertain to the transfer and placement of children of military families in Georgia public schools were added to Georgia State Law. Among other provisions, the law requires that the local school system shall initially honor placement of the student in educational courses based on the student's enrollment in the sending state school or educational assessments conducted at the school in the sending state, if the courses are offered. Course placement includes but is not limited to honors, international baccalaureate, advanced placement, vocational, technical, and career pathways courses. Continuing the student's academic program from the previous school and promoting placement in academically and career challenging courses should be paramount when considering placement. Additionally, local school systems shall have flexibility in waiving course or program prerequisites or other preconditions for placement in courses and programs offered by the local school system.

Student Placement for Students Transferring out of Georgia Schools

Content descriptions (provided on pages 11-13) for all completed high school mathematics courses need to accompany transcripts of students transferring out of Georgia schools.

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Section 5: Mathematics Support Guidance for High School Students

We are dedicated to providing appropriate support for all students to ensure their successful completion of core academic high school mathematics coursework. The purpose of mathematics support courses is to address the needs of students who have traditionally struggled in mathematics by providing the additional time and attention they need.

The **Foundations of Algebra** course was developed to meet the needs of high school students who have completed mathematics in grades 6 – 8 yet will need **substantial** support to bolster success in high school mathematics. The course is aimed at students who have reported low standardized test performance in in prior grades and/or have demonstrated significant difficulties in previous mathematics classes. Guidance for administrators and counselors in student selection can be accessed at the Georgia Department of Education Mathematics Program webpage <http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Pages/Mathematics.aspx>, including an administrator/counselor information video and a Monitoring Guidance document. Teacher resources for the course can be found at <https://www.georgiastandards.org/Common-Core/Pages/Math-9-12.aspx>. Students who successfully complete the course will be awarded one **core** mathematics credit.

Also available for **additional** and ongoing student support are **Mathematics Support** courses which are taught concurrently with a student's core academic mathematics course. Support courses are awarded elective credit. **Support courses can be retaken for additional elective credit if students retake core academic mathematics courses in which they were not initially successful and choose to retake the associated support course.**

How should students be selected to be enrolled in mathematics support courses?

Students who are *placed* in high school and have not passed middle school math state assessments should certainly be afforded the benefit of a support course. Other criteria might include teacher recommendation based on student performance in the previous or current mathematics course, prior retention, a failing grade in a mathematics course, and/or low scores on the mathematics component of state assessments, high school mathematics assessment, or other instruments used by the system to predict success.

Students are enrolled in **Foundations of Algebra** and/or **Mathematics Support Courses**, for Algebra I, Coordinate Algebra, Geometry, Analytic Geometry, Algebra II, and Advanced Algebra, based on local system criteria for identifying students who are at risk for failing mathematics.

Who should teach mathematics support courses?

Mathematics support courses should be taught by a certified mathematics teacher, preferably one with an understanding of growth mindset in mathematics and demonstrated experience in effectively differentiating instruction to meet the needs of struggling students. If English Learners are being served in a mathematics support course, it is recommended that the teacher also hold the ESOL endorsement. The mathematics support teacher should work closely with the teacher(s) teaching the associated core mathematics course to align content, instruction, and assessments

Mathematics Graduation Requirement Guidance

2016 - 2017

How important is collaboration among teachers to the success of students enrolled in mathematics support courses?

Teachers of the mathematics support courses and the academic core mathematics courses, including collaborative English Learner (EL) and special education teachers, share the responsibility for students' mathematical achievement. In fact, all teachers who instruct students who are enrolled in mathematics support courses should consistently and frequently engage in communication which focuses on:

- individual student progress, including grades, strengths and weaknesses based on standards mastery, mathematical disposition, and work habits;
- curriculum expectations, including specific standards to be addressed based on a timeline, prerequisite skills, vocabulary, and potential misconceptions;
- instructional strategies, including specific strategies for teaching math concepts that are being used to provide consistency and understanding for teachers and students;
- differentiation of instruction;
- formative and summative assessments, including content and formats that are being used to evaluate students for specific standards.

What are the critical components of mathematics support courses?

- Students enrolled in **Foundations of Algebra** should be assessed frequently and appropriate interventions should be made available – the goal being readiness for Algebra I or Coordinate Algebra.
- The **Mathematics Support** course should focus on mastery of the standards being taught in the associated core academic mathematics course, and not on general content from elementary or middle school.
- All students in a particular **Mathematics Support** course should be enrolled in the same core academic mathematics course. (i.e., students enrolled in Coordinate Algebra Support will all be enrolled in Coordinate Algebra).
- Grading practices should emphasize mastery of standards through the frequent use of aligned quizzes and tests, both formative and summative.
- Continual progress monitoring should be used to assess and diagnose each student's strengths and weaknesses, based on the standards of the associated core academic mathematics course, and to provide appropriate interventions.
- Opportunities should be provided for students to review content with a focus on standards not previously mastered.
- Opportunities should be provided for students to preview the mathematical concepts associated with the subsequent or concurrent core academic mathematics course. Attention needs to be given to prerequisite skills and concepts and to the vocabulary of the current course.
- The academic language of mathematics should be explicitly taught as concepts are introduced and reinforced.
- Proven strategies for success in mathematics should be utilized on a daily basis. Students should be engaged in doing mathematics, explaining their thinking, and justifying their work. Multiple representations of concepts (tables, charts, graphs, verbal descriptions) should be used as often as possible.
- There should be strong emphasis on building a positive disposition toward learning mathematics.
- Although there is no class size requirement for the mathematics support courses, a reduced class size is recommended.

Mathematics Graduation Requirement Guidance

2016 - 2017

○ How will students be evaluated in mathematics support courses?

The goal of a mathematics support course is to assist students in the successful completion of subsequent and/or associated core academic mathematics course. Assignments, quizzes and tests should be aligned to the standards being taught in Foundations of Algebra or in the associated core academic course. Individuals should be given multiple opportunities to show mastery of the content.

In Mathematics Support courses, opportunities to demonstrate mastery of material first addressed in the associated core academic mathematics course should be provided. Mathematics support provides the time some students need for additional practice or re-testing. The value of formative assessment and feedback cannot be overstated. Continuous progress monitoring with both feedback and commentary is essential in support courses. **Students should not feel pressure to “make grades” as much as they should be motivated and encouraged to master standards.** Documented continuous communication with students on an individual basis is the most appropriate way to maintain records of progress.

Will schools be able to receive Remedial Education Program (REP) for students enrolled in support courses?

REP can support funding for the Foundations of Algebra and Mathematics Support courses if REP guidelines for eligibility, scheduling, and class size are followed.

Mathematics Graduation Requirement Guidance

2016 - 2017

Section 6: Resources Available to Middle School and High School Counselors

- Sandi Woodall, Mathematics Program Manager
swoodall@doe.k12.ga.us
- Brooke Kline, Mathematics Secondary Specialist
bkline@doe.k12.ga.us
- GaDOE Mathematics Program Webpage
<http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Pages/Mathematics.aspx>
- GaDOE GeorgiaStandards.org Mathematics Website
<https://www.georgiastandards.org/Common-Core/Pages/default.aspx>
- Staying On Course: University System of Georgia High School Curriculum Requirements
http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf
- 2016-2017 State-Funded List of K-8 Subjects and 9-12 Courses
<https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Documents/State-Funded-List-of-Subjects-and-Courses-Supported-by-SBOE-Rule-160-4-2-20.pdf>
- Georgia High School Graduation Rule
<https://www.gadoe.org/External-Affairs-and-Policy/State-Board-of-Education/SBOE%20Rules/160-4-2-.48.pdf>
- Awarding Units of Credit and Acceptance of Transfer Credit and/or Grades Rule
[https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Documents/160-5-1-%202015%20Awarding%20Units%20of%20Credits%202-11-13%20posting%20\(3\).pdf](https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Documents/160-5-1-%202015%20Awarding%20Units%20of%20Credits%202-11-13%20posting%20(3).pdf)
- Guidelines for Awarding Units of Credit Rule
<https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Documents/Guidelines%20Awarding%20Units%20of%20Credit%20160-5-1-%202015%20204-3-13%20with%20Appendices.pdf>
- SWD High School Mathematics Decision Rubric
<https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Documents/SWD%20High%20School%20Mathematics%20Decision%20Rubric%202-15-13.pdf>

Move On When Ready Mathematics Frequently Asked Questions

1. How do we align the Move On When Ready (MOWR) mathematics codes to the high school mathematics courses that are required to graduate?

Effective Summer 2016, the MOWR courses will provide fourth mathematics course options in addition to identified high school courses to meet the fourth mathematics requirement for graduation. The codes attached to the MOWR courses are unique codes which identify the course name and post-secondary institution where the course was completed. Alignment to high school courses will no longer be needed.

2. Will we need to know how the fourth mathematics high school options match up with the high school course names?

Because MOWR mathematics courses will have unique course codes and authentic course titles, high school counselors will no longer be expected to match college level courses with high school course names.

3. How do you recommend we advise students for the fourth mathematics requirements for summer and fall enrollment?

Students should choose a fourth course mathematics option based on post-secondary and career aspirations (STEM vs. non-STEM careers). The 2015-2016 Mathematics Graduation Requirement Guidance document (pages 8 and 11) will provide assistance in choosing appropriate high school level fourth course options. Post-secondary institutions will assist with college level MOWR course descriptions.

4. Are MOWR courses always awarded elective credit?

MOWR approved mathematics courses are awarded **core/elective** credit for the fourth mathematics course requirement beyond Algebra II.

5. Will students pursuing an alternate diploma through Senate Bill 2 be required to have more than two high school core mathematics credits?

Senate Bill 2 states that a local board of education may award a high school diploma to a student enrolled in coursework at a post-secondary institution if the following criteria are met.

- a. Student has completed at least the following state required ninth and tenth grade high school courses: two English courses, two mathematics courses, two science courses, and two social studies courses, and any state required tests associated with any such courses.

Georgia Department of Education

- b. Student has received a score of admission acceptable on the readiness assessment required by the postsecondary institution.
- c. Student has completed: (i) an associate degree program; (ii) a technical college diploma program and all postsecondary academic education and technical education and training prerequisites for any state, national, or industry occupational certifications or licenses required to work in the field; or (iii) at least two technical college certificate of credit programs in one specific career pathway and all postsecondary academic education and technical education and training prerequisites for any state, national, or industry occupational certifications or licenses required to work in the field.

6. Can **Diploma level** Math courses at TCSG institutions be used for core math credit for High School?

Diploma Level TCSG courses may be awarded core mathematics credit by the local board of education only if a student meets the criteria below as explained in Senate Bill 2.

- a. Student has completed at least the following state required ninth and tenth grade high school courses: two English courses, two mathematics courses, two science courses, and two social studies courses, and any state required tests associated with any such courses.
- b. Student has received a score of admission acceptable on the readiness assessment required by the postsecondary institution.
- c. Student has completed a technical college diploma program and all postsecondary academic education and technical education and training prerequisites for any state, national, or industry occupational certifications or licenses required to work in the field.

7. How will the MOWR program impact students relative to NCAA eligibility?

NCAA requires mathematics core credits in Algebra I or Coordinate Algebra, Geometry or Analytic Geometry, and Algebra II or Advanced Algebra, for a total of three core credits.

8. If Algebra II/Advanced Algebra must be completed at the high school, is it unlikely that juniors are able to participate in MOWR full-time?

Talented mathematics students are often provided the opportunity to begin high school mathematics in grade 8 in either an accelerated or grade level sequence or in grade nine in an accelerated level sequence. Students also have the option of completing Georgia Virtual courses for acceleration. These students will complete Algebra II and be prepared for college level MOWR coursework prior to their junior year in high school.

Georgia Department of Education

9. Would students on the **accelerated math sequence** be eligible for MOWR courses in their junior year?

Students enrolled in the accelerated sequence of mathematics courses who begin high school coursework in grade 8 - **Accelerated Coordinate Algebra/Analytic Geometry A and Accelerated Analytic Geometry B/Advanced Algebra OR Accelerated Algebra I/Geometry A and Accelerated Geometry B/Algebra II** – are eligible for MOWR mathematics courses in the 10th grade; those who begin accelerated high school coursework in grade nine are eligible in the 11th grade.

10. Is it accurate to conclude that all high school students must take Algebra I, Geometry and Algebra II at their high school and that only the fourth mathematics credit can be earned at the post-secondary institution?

Yes, except for those students who meet the criteria associated with Senate Bill 2. Students may choose to enroll in MOWR mathematics courses for **elective** credit as well.

11. Is there a COLLEGE level course that is equivalent to the Algebra II or Advanced Algebra high school course?

No, because our students prepared for college level courses only after they have mastered the college readiness standards which culminate in Advanced Algebra or Algebra II. Neither USG nor TCSG has approved College Algebra as an equivalent of Algebra II/Advanced Algebra. Algebra II or Advanced Algebra is required for high school graduation.

12. Can College Algebra be used for Advanced Algebra or Algebra II at the high school?

No, because College Algebra is not an equivalent of Advanced Algebra or Algebra II. The 2015-2016 Mathematics Graduation Requirement Guidance document references equivalent courses on page 5 of the document.

“NOTE: Accelerated Coordinate Algebra/Analytic Geometry A and Accelerated Analytic Geometry B/Advanced Algebra include the standards of Coordinate Algebra, Analytic Geometry, and Advanced Algebra. At the present time, these are the only equivalent courses for Coordinate Algebra, Analytic Geometry, and Advanced Algebra. Accelerated Algebra I/Geometry A and Accelerated Geometry B/Algebra II include the standards of Algebra I, Geometry, and Algebra II. At the present time, these are the only equivalent courses for Algebra I, Geometry, and Algebra II.”

It is important to note that neither USG nor TCSG has approved College Algebra as an equivalent of Advanced Algebra or Algebra II.

Georgia Department of Education

13. I have students who enter MOWR after only completing Algebra and Geometry. What course number do we need to use for Algebra II?

Our students are prepared for college level mathematics courses once they have mastered college readiness standards which culminate in Advanced Algebra or Algebra II. For that reason, **there are no MOWR course equivalents for Algebra II/Advanced Algebra**. Neither USG nor TCSG has approved College Algebra as an equivalent of Algebra II/Advanced Algebra. Algebra II or Advanced Algebra is required for high school graduation.

14. Will students who are already in the MOWR program need to go back to take Algebra II?

Students will need credit in Algebra I OR Coordinate Algebra, Geometry OR Analytic Geometry, Algebra II OR Advanced Algebra, and a fourth mathematics course option to meet high school mathematics graduation requirements.

In rare occasions, students will enroll in an alternate sequence: Algebra I or Coordinate Algebra + Geometry or Analytic Geometry + Pre-Calculus. This sequence has been approved by the GaDOE Policy Division as an acceptable alternate sequence. Students who choose this sequence are talented mathematics students and are expected to move forward to appropriate college level courses such as Calculus, Statistics, or Computer Science.

Because MOWR policy is new, there are currently students who have taken both MOWR College Algebra and College Pre-Calculus. The Pre-Calculus course is an acceptable replacement for Advanced Algebra OR Algebra II and while College Algebra is not a recommended fourth course for students who have completed Pre-Calculus, this sequence will suffice for high school graduation and some USG post-secondary admissions. However, it is not recommended that students enroll in College Algebra after completing only Algebra I OR Coordinate Algebra and Geometry OR Analytic Geometry as this decision requires successful completion of Pre-Calculus.

15. In the past, we have allowed our seniors to take College Algebra and/or Pre-Calculus through our local technical college to meet the fourth math requirement for graduation. When I access the mathematics course numbers on the MOWR directory, all of the mathematics courses have an A in the course number. Does that mean none of those courses can count toward the 4th math requirement for graduation?

All approved MOWR mathematics courses are options for the fourth mathematics core course (c/e) requirement.

160-4-2-.48 HIGH SCHOOL GRADUATION REQUIREMENTS FOR STUDENTS ENROLLING IN THE NINTH GRADE FOR THE FIRST TIME IN THE 2008-09 SCHOOL YEAR AND SUBSEQUENT YEARS.

(1) **PURPOSE.** This rule specifies programs of study that shall be offered by local boards of education for students enrolling in the ninth grade for the first time in the 2008-2009 School Year and for subsequent years.

(2) **DEFINITIONS.**

(a) **Career, Technical and Agricultural Education (CTAE) Pathways** – Three elective units in a coherent sequence that includes rigorous content aligned with industry-related standards leading to college and work readiness in a focused area of student interest.

(b) **Core Courses** - courses identified as “c” or “r” in Rule 160-4-2-.20 List of State-Funded K-8 Subjects and 9-12 Courses.

(c) **Elective Courses** – any courses identified as “e” in Rule 160-4-2-.20 List of State-Funded K-8 Subjects and 9-12 Courses that a student may select beyond the core requirements to fulfill the unit requirements for graduation.

(d) **Georgia Alternate Assessment (GAA)** -- an alternate assessment based on alternate achievement standards. The GAA is a portfolio assessment designed for students with significant cognitive disabilities under the Individuals with Disabilities Education Act (IDEA) whose IEP team has determined they are unable to reasonably participate in the regular assessment program. The purpose of the GAA is to ensure all students, including students with significant cognitive disabilities, are provided access to the state curriculum and given the opportunity to demonstrate progress toward achievement of the state standards.

(e) **Required courses** - specific courses identified as “r” in Rule 160-4-2-.20 List of State-Funded K-8 Subjects and 9-12 Courses that each student in a program of study shall pass to graduate from high school.

(f) **Secondary School Credential** - a document awarded to students at the completion of the high school experience.

1. **High School Diploma** - the document awarded to students certifying that they have satisfied attendance requirements, unit requirements and the state assessment requirements as referenced in Rule 160-3-1-.07 Testing Programs - Student Assessment.

2. **High School Certificate** - the document awarded to pupils who do not complete all of the criteria for a diploma or who have not passed the state assessment requirements as referenced in Rule 160-3-1-.07 Testing Programs – Student Assessment, but who have earned 23 units.

3. **Special Education Diploma** - the document awarded to students with disabilities assigned to a special education program who have not met the state assessment requirements referenced in Rule 160-3-1-.07 Testing Programs - Student Assessment or who have not completed all of the requirements for a high school diploma but who have nevertheless completed their Individualized Education Programs (IEP).

(g) **Significant Cognitive Disabilities** – students with significant intellectual disabilities or intellectual disabilities concurrent with motor, sensory or emotional/behavioral disabilities who require substantial adaptations and support to access the general curriculum and require additional instruction focused on relevant life skills and participate in the Georgia Alternate Assessment (GAA).

(h) **Unit** – one unit of credit awarded for a minimum of 150 clock hours of instruction or 135 hours of instruction in an approved block schedule.

(i) **Unit, Summer School** – one unit of credit awarded for a minimum of 120 clock hours of instruction.

(3) REQUIREMENTS.

(a) Local boards of education shall provide secondary school curriculum and instructional and support services that reflect the high school graduation and state assessment requirements and assist all students in developing their unique potential to function in society.

(b) Local boards of education shall require that

1. Students who enroll from another state meet the graduation requirements for the graduating class they enter and the state assessment requirements as referenced in Rule 160-3-1-.07 Testing Programs - Student Assessment.

2. Students who enroll in the ninth grade for the first time in the 2008-2009 school year and withdraw shall meet the graduation requirements specified in this rule and the assessment requirements specified in Rule 160-3-1-.07 Testing Programs - Student Assessment.

3. UNITS OF CREDIT.

- (i) All state-supported high schools shall make available to all students the required areas of study.
- (ii) A course shall count only once for satisfying any unit of credit requirement for graduation. See the following chart.

(iii) **AREAS OF STUDY.**

	Units Required
(I) English/Language Arts*	4
(II) Mathematics*	4**
(III) Science*	4

The 4th science unit may be used to meet both the science and elective requirement

(IV) Social Studies*	3
(V) CTAE and/or Modern Language/Latin and/or Fine Arts	3
(VI) Health and Physical Education*	1
(VII) Electives	4

TOTAL UNITS (MINIMUM) 23

*Required Courses and/or Core Courses

** Students entering ninth grade in 2008-2009, 2009-2010, and 2010-2011 only, who earn credit in Mathematics I and Mathematics II or GPS Algebra and GPS Geometry, along with 2 additional core mathematics courses, will have satisfied the **minimum** mathematics requirements for high school graduation.

4. COURSE CREDIT.

(i) Unit credit shall be awarded only for courses that include concepts and skills based on the Georgia Performance Standards (GPS) or Common Core Georgia Performance Standards (CCGPS) for grades 9-12 or those approved by the State Board of Education. Unit credit may be awarded for courses offered in the middle grades that meet 9-12 GPS or CCGPS requirements. The Individualized Education Program (IEP), if applicable, shall specify whether core courses taken as part of an IEP shall receive core unit credit.

(ii) No course credit may be awarded for courses in which instruction is based on the GPS for grades K-8.

(iii) Completion of diploma requirements does not necessarily qualify students for the HOPE Scholarship Program.

5. AREAS OF STUDY.

(i) Courses that shall earn unit credit are listed in Rule 160-4-2-.20 List of State-Funded K-8 Subjects and 9-12 Courses for Students Entering Ninth Grade in 2008 and Subsequent Years.

(ii) Any student may select any course listed in the course listing rule. The one exception to this provision is where the letter "r" appears with course names. These courses are required. They **must** be successfully completed and cannot be substituted with any other course. Any course identified as "c" is a core course and may be selected to count as one of the core unit requirements. A course identified as "e" is an elective course that may be selected beyond the core requirements to fulfill the unit requirements.

(I) **English Language Arts:** Four units of credit in English language arts shall be required of all students. A full unit of credit in American Literature/Composition and a full unit of credit in Ninth-Grade Literature and Composition shall be required. All courses that may satisfy the remaining units of credit are identified with a "c." The Writing, Conventions, and Listening, Speaking, and Viewing strands of the Georgia Performance Standards shall be taught in sequence in grades 9-12. Literature modules may be taught in any sequence in grades 10-12.

(II.) **Mathematics:** Four units of core credit in mathematics shall be required of all students, including Mathematics I or GPS Algebra, or its equivalent and Mathematics II or GPS Geometry, or its equivalent and Mathematics III or GPS Advanced Algebra or its equivalent. Additional core courses needed to complete four credits in mathematics must be chosen from the list of GPS/ CCGPS /AP/IB/dual enrollment designated courses.

I. The mathematics requirements above apply to each student with a disability, consistent with his or her Individualized Education Program. Students with Disabilities who earn credit in Mathematics I or GPS Algebra and the associated mathematics support course, and Mathematics II or GPS Geometry and the associated mathematics support course, may upon determination through the Individualized Education Program Team meet mathematics diploma requirements by completing Mathematics III or GPS Advanced Algebra for a total of 3 mathematics core credits. Successful completion of 3 core units of mathematics may not meet the mathematics admission requirements for entrance into a University System of Georgia institution or other post-secondary institution without additional coursework.

II. All students, including students with disabilities, who enter ninth grade in 2008-2009, 2009-2010, and 2010-2011, only and who earn core credit in Mathematics I and Mathematics II or GPS Algebra and GPS Geometry, along with 2 other core mathematics courses, will have satisfied the minimum mathematics requirements for high school graduation. Mathematics Support I, GPS Algebra Support I,

Mathematics Support II, GPS Geometry Support II, and Mathematics Support III, and GPS Advanced Algebra Support III may be designated as elective or core courses for students who entered ninth grade in 2008-2009, 2009-2010, 2010-2011. Students who complete Mathematics I and Mathematics II or GPS Algebra and GPS Geometry, along with 2 other core mathematics courses, but who do not complete Mathematics III or GPS Advanced Algebra, may not meet the mathematics admission requirements for entrance into a University System of Georgia institution or other post-secondary institutions without additional coursework.

(III) **Science:** Four units of credit in science shall be required of all students, including one full unit of Biology; one unit of either Physical Science or Physics; one unit of either Chemistry, Earth Systems, Environmental Science or an AP/IB course; and one additional science unit. The fourth science unit may be used to meet both the science and elective requirements. Any AP/IB science course may be substituted for the appropriate courses listed above.

(IV) **Social Sciences:** Three units of credit shall be required in social studies. One unit of credit shall be required in United States History. One unit of credit shall be required in World History. One-half unit of American Government/Civics shall be required. One-half unit of Economics shall be required.

(V) **CTAE/Modern Language/Latin/Fine Arts:** A total of three units of credit shall be required from the following areas: CTAE and/or Modern Language/Latin and/or Fine Arts. Students are encouraged to select courses in a focused area of interest.

I. **Career, Technical and Agricultural Education (CTAE) Pathways:** Students may earn three units of credit in a coherent sequence of CTAE courses through a self-selected pathway leading to college readiness and a career readiness certificate endorsed by related industries.

II. **Modern Language/Latin:** All students are encouraged to earn two units of credit in the same modern language/Latin. Students planning to enter or transfer into a University System of Georgia institution or other post-secondary institution must take two units of the same modern language/Latin. Georgia Department of Technical and Adult Education (DTAE) institutions (Technical College System of Georgia) do not require modern language/Latin for admissions.

A. Students whose native language is not English may be considered to have met the foreign language expectation by exercising the credit in lieu of enrollment option if they are proficient in their native language. A formal examination is not necessary if other evidence of proficiency is available.

B. American Sign Language may be taken to fulfill the modern language requirements.

III. **Fine Arts:** Electives may be selected from courses in fine arts.

(VI) **Health and Physical Education:** One unit of credit in health and physical education is required. Students shall combine one-half or one-third units of credit of Health (17.011), Health and Personal Fitness (36.051), or Advanced Personal Fitness (36.061) to satisfy this requirement. Three (3) units of credit in JROTC (Junior Reserve Officer Training Corps) may be used to satisfy this requirement under the following conditions: 1) JROTC courses must include Comprehensive Health and Physical Education Rule requirements in rule 160-4-2-.12 and 2) the local Board of Education must approve the use of ROTC courses to satisfy the one required unit in health and physical education.

6. REQUIRED PROCEDURES FOR AWARDING UNITS OF CREDIT.

(i) A unit of credit for graduation shall be awarded to students only for successful completion of state-approved courses of study based on a minimum of 150 clock-hours of instruction provided during the regular school year, 135 clock-hours of instruction in an approved block schedule during the regular school year, or a minimum of 120 clock-hours of instruction in summer school.

7. STUDENTS WITH SIGNIFICANT COGNITIVE DISABILITIES.

(i) Students with significant cognitive disabilities may graduate and receive a regular high school diploma when the student's IEP team determines that the student has:

(I) completed an integrated curriculum based on the GPS that includes instruction in Mathematics, English/Language Arts, Science and Social Studies as well as career preparation, self determination, independent living and personal care to equal a minimum of 23 units of instruction, and

(II) participated in the GAA during middle school and high school and earned a proficient score on the high school GAA in Mathematics, English/Language Arts, Science, and Social Studies, and

(III) reached the 22nd birthday OR has transitioned to an employment/education/training setting in which the supports needed are provided by an entity other than the local school system.

8. LOCAL AUTHORITIES AND RESPONSIBILITIES.

(i) Local boards of education shall provide instructional, support and delivery services. These services shall include, but are not limited to, the following:

(I) A continuous guidance component beginning in middle school. The purposes of the guidance component are to familiarize students with graduation requirements, to help them identify the likely impact of individual career objectives on the program of studies they plan to follow and to provide annual advisement sessions to report progress and offer alternatives in meeting graduation requirements and career objectives.

(II) Record keeping and reporting services that document student progress toward graduation and include information for the school, parents and students.

(III) Diagnostic and continuous evaluation services that measure individual student progress in meeting competency expectations for graduation.

(IV) Instructional programs, curriculum and course guides and remedial opportunities to assist each student in meeting graduation requirements.

(V) Appropriate curriculum and assessment procedures for students who have been identified as having disabilities that prevent them from meeting the prescribed competency performance requirements.

Authority O. C. G. A. § 20-2-131; 20-2-140; 20-2-142; 20-2-150(a); 20-2-151(a), (b); 20-2-154(a); 20-2-160; 20-2-161.1; 20-2-161.2; 20-2-281(a), (c).

Adopted: July 21, 2011

Effective: August 11, 2011