

Department of Legislative Services
Maryland General Assembly
2020 Session

FISCAL AND POLICY NOTE
First Reader

Senate Bill 892 (Senator Hester)
Education, Health, and Environmental Affairs

Public Schools – Mathematics Credit – Computer Science or Computer
Programming Course

This bill authorizes a student enrolled at a public high school to satisfy one credit of a requirement to earn three credits in mathematics by completing a credit in a computer science or computer programming course selected by the local board of education if the local board has certified to the Maryland State Department of Education (MSDE) that the course may count toward that mathematics graduation requirement. **The bill takes effect July 1, 2020.**

Fiscal Summary

State Effect: None. The bill generally codifies existing practice.

Local Effect: None. The bill generally codifies existing practice. A local school system may currently allow a student to satisfy a State or local mathematics requirement by taking Advanced Placement (AP) Computer Science or another computer science course that the local board of education determines meet the mathematics standards. However, the local board is not currently required to certify to MSDE that a computer science course counts towards mathematics graduation requirement.

Small Business Effect: None.

Analysis

Current Law/Background:

Computer Science Courses

Chapter 358 of 2018 requires, beginning in the 2021-2022 school year, each public high school to offer at least one high-quality computer science course that meets or exceeds the curriculum standards and requirements established by the State Board of Education. Local boards must also make efforts to (1) incorporate computer science in each public elementary and middle school and (2) increase enrollment in middle and high school computer science courses from the following categories:

- female students;
- students with disabilities; and
- students of ethnic, racial, and other demographic groups that are underrepresented in the field of computer science as identified by the U.S. Equal Employment Opportunity Commission.

High School Diploma Requirements

With the advice of the State Superintendent of Schools, the State Board of Education must establish minimum requirements for issuing certificates and diplomas by public and private high schools. Local school systems may establish graduation requirements beyond the minimum requirements established by the board.

Public High School Diploma Requirements

According to the College and Career Readiness and College Completion Act of 2013 (Chapter 533), each student must enroll in a mathematics course in each year of high school that the student attends high school. MSDE may adopt regulations that establish the mathematics and math-related courses that fulfill the requirements, which may include math-related career and technology program courses. Further, it is the goal of the State that all students achieve mathematics competency in Algebra II.

According to regulations, to be awarded a high school diploma, a student must be enrolled in a Maryland public school system and have earned a minimum of 21 credits in specified subjects as detailed in **Appendix – State Public High School Diploma Credit Requirements**. The regulations state that students must enroll in a mathematics course in each year of high school that the student attends up to a maximum of four years of attendance unless in the fifth or sixth year a mathematics course is needed to meet a graduation requirement. Mathematics and mathematics-related courses must include a

mathematics transition course, Algebra II, Pre-calculus, Discrete Mathematics, Linear Algebra, probability and statistics, AP Computer Science, AP Calculus (A/B), AP Calculus (B/C), or a computer science course that is not AP Computer Science if the local school system determines that course meets the mathematics standards.

Maryland High School Graduation Task Force

In October 2018, the Maryland High School Graduation Task Force convened by the State Superintendent of Schools produced a [final report](#). According to the task force, 29 states allow computer science credit to substitute for some mathematics credit, including Maryland. Four other states allow districts to determine if computer science will replace mathematics or science credits.

The task force recommended that the State board maintain the three credits in science as described in current regulations as a graduation requirement. The task force also recommended that computer science be allowed to be substituted for one credit of math. Current regulations states that AP Computer Science may fulfill a math credit toward graduation requirements. The task force also recommended that students who have not demonstrated competency in Algebra I should continue to take courses that develop Algebra I competencies.

The State board has not yet taken action on any of the task force's recommendations.

Higher Education Admissions Standards

According to University System of Maryland (USM) [policy](#), which was last updated October 2017, in general, the minimum qualifications for regular admission to a USM institution are (1) a high school diploma or its equivalent; (2) a high school grade point average of a C or better; (3) a score on a nationally standardized examination such as the SAT or ACT; and (4) achievement at the appropriate level of competencies in the core content associated with specified courses. A grade of a C or better in required courses normally demonstrates the minimum level of preparation for college-level work.

Each institution may admit, up to a maximum of 15% of its entering freshman class, students who do not meet the minimum qualifications outlined in the policy but who show potential for success in postsecondary education. Each institution must develop written guidelines concerning individual admission. For those instances in which applicants have not completed all of the required courses for admission, each institution must establish a method of assessment by which a student can demonstrate competence, equivalent to having passed a required high school course, to qualify for admission.

As shown in **Exhibit 1**, generally, to be admitted to a USM institution, a student must earn a grade of a C or better in four credits of mathematics. The courses must include Algebra I, SB 892/ Page 3

Geometry, and Algebra II. Students who complete Algebra II prior to their final year must complete the four-year mathematics requirement by taking a course or courses that utilize nontrivial algebra. Nontrivial algebra is intended to mean that the level of mathematical concepts discussed and the level of problems that are used in the course would be at least as sophisticated as those that relate to problems appearing in the Achieve American Diploma Project (ADP) Algebra II test. Examples of courses meeting this requirement include Algebra II, Trigonometry, Precalculus, Calculus and successor courses, Statistics, and College Algebra. An important feature of any such course is that it utilize algebra in a substantive way, so the student does not lose the algebraic and numerical skills achieved in earlier courses. Essentially, according to these USM standards a computer science course may be one for the four required courses, but not the final course.

Morgan State University requires three years of mathematics or State-approved equivalent including, Algebra I or applied math I, formal logic or Geometry, and Algebra II or applied math II. A fourth year of mathematics is strongly recommended. Community colleges are open enrollment institutions and do not have a math requirement. St. Mary's College of Maryland does not list any high school credit requirements on their website.

Private institutions of higher education and public institutions of higher education in other states set their own admissions requirements.

Baltimore City Public School System

Baltimore City Public School System (BCPSS) advises it currently requires Algebra I, Geometry, Algebra II, and a fourth course above the Algebra I level for its mathematics graduation requirements. BCPSS advises it would accept a math-aligned computer science courses as meeting a mathematics graduation requirement from a student who transfers from another district, but it would not build a math-aligned computer science in to its core, required high school mathematics course sequence. However, BCPSS high school students receive computer science instruction via Foundations in Computer Science. This course meets the technology education graduation requirement. Finally, BCPSS advises that it aligns its mathematics requirements with the minimum requirements to apply to USM institutions.

Baltimore County Public Schools

Baltimore County Public Schools advises that under current regulations local school systems are authorized to designate computer science courses as a mathematics course for student graduation requirements.

Exhibit 1
High School Courses Generally Required for Admission to a
University System of Maryland Institution

<u>Subject</u>	<u>Year</u> <u>Courses</u>
English	4
Biological and Physical Sciences ¹	3
Social Science/History	3
Mathematics ²	4
Language other than English or in some instances an advanced technology language other than English ³	2

¹The courses completed must be in at least two different subject areas. Two of the three must include a laboratory experience. For students interested in Science, Technology, Engineering, or Mathematics (known as “STEM”) related careers (such as medicine, engineering, the sciences, veterinary medicine, physical therapy, *etc.*), four years of science are recommended in three different science areas, with three laboratory experiences.

²Must include Algebra I, Geometry, and Algebra II. Students who complete Algebra II prior to their final year must complete the four-year mathematics requirement by taking a course or courses that utilize nontrivial algebra. Nontrivial algebra is intended to mean that the level of mathematical concepts discussed and the level of problems that are used in the course would be at least as sophisticated as those that relate to problems appearing in the Achieve ADP Algebra II test. Examples of courses meeting this requirement include Algebra II, Trigonometry, Precalculus, Calculus and successor courses, Statistics, and College Algebra. An important feature of any such course is that it utilize algebra in a substantive way, so the student does not lose the algebraic and numerical skills achieved in earlier courses.

³The two units must be in the same language. American Sign Language is among the languages accepted. Students should consult the admissions office of the institution they are seeking to attend to determine if advanced technology electives are accepted in fulfillment of this requirement.

Source: University System of Maryland [policy](#); Department of Legislative Services

Additional Information

Prior Introductions: None.

Designated Cross File: HB 1153 (Delegate Rose, *et al.*) - Ways and Means.

Information Source(s): Maryland State Department of Education; Baltimore City Public Schools; Baltimore County Public Schools; Montgomery County Public Schools; University System of Maryland; Morgan State University; Department of Legislative Services

Fiscal Note History: First Reader - February 28, 2020
rh/rhh

Analysis by: Caroline L. Boice

Direct Inquiries to:
(410) 946-5510
(301) 970-5510

Appendix – State Public High School Diploma Credit Requirements

According to State regulations, to be awarded a high school diploma, a student must be enrolled in a Maryland public school system and have earned a minimum of 21 credits in specified subjects as detailed in **Exhibit 1**.

Exhibit 1 Distribution of Credits Required to Graduate High School

<u>Subject</u>	<u>Credits</u>
English	4.0
Fine Arts	1.0
Mathematics ¹	3.0
Physical Education	0.5
Health Education	0.5
Science	3.0
Social Studies	3.0
Technology Education	1.0
World Language <i>or</i> American Sign Language <i>or</i> Advanced Technology Education ²	2.0
Electives ²	3.0

¹However, beginning with students entering grade 9 in the 2014-2015 school year, each student must enroll in a mathematics course in each year of high school that the student attends, up to a maximum of four years of attendance, unless in the fifth or sixth year a mathematics course is needed to meet a graduation requirement.

²Alternatively, a student may successfully complete a State-approved career and technology program for four credits and one credit in an elective.

Note: The credits must meet other requirements specified in the Code of Maryland Regulations. Elective programs and instruction must be developed at the discretion of the local school system, be open to enrollment for all students, and focus on in-depth study in required subject areas, exploration, or application and integration of what has been learned. In addition, all students must complete a locally designed high school program of environmental literacy approved by the State Superintendent of Schools.

Source: Code of Maryland Regulations; Department of Legislative Services
