Date of Hearing: April 26, 2023

ASSEMBLY COMMITTEE ON EDUCATION
Al Muratsuchi, Chair
AB 1054 (Berman) – As Amended March 23, 2023

**SUBJECT**: Student instruction: high schools: computer science education courses

**SUMMARY**: Requires that school districts and charter schools serving students in grades 9 through 12 offer courses in computer science according to a specified timeline, and, by June 30, 2026, school districts and charter schools to submit specified data about computer science courses and coursetaking to the California Department of Education (CDE). Specifically, **this bill**:

1) Requires school districts and charter schools maintaining any of grades 9 to 12, offer at least one course in computer science education pursuant to the following timeline:

    a) Commencing with the 2025–26 school year, at least one high school per school district must offer a computer science education course. Requires school districts maintaining only one high school to instead offer a computer science education course no later than the 2026–27 school year;

    b) Commencing with the 2026–27 school year, all charter schools maintaining any of grades 9 to 12, must offer a computer science education course;

    c) Commencing with the 2026–27 school year, at least 50% of the high schools per school district must offer a computer science education course; and

    d) Commencing with the 2027–28 school year, all high schools in a school district must offer a computer science education course.

2) Establishes the following definitions for purposes of this requirement:

    a) "Computer science" means the study of computers and algorithmic processes, including their principles, hardware and software designs, implementation, and impact on society, as described in the computer science academic content standards adopted by the State Board of Education (SBE); and

    b) "Computer science education course" means a computer science course that is aligned to the computer science academic content standards adopted by the (SBE) and in which students do not merely use technology as passive consumers, but understand why and how computing technologies work, and then build upon that conceptual knowledge by creating computational artifacts.

3) Permits computer science education courses offered for purposes of this requirement to be provided as in-person instruction, defined as instruction under the immediate physical supervision and control of a certificated employee or hybrid models offering fewer than five days per week of in-person instruction.

4) Permits, if a traditional classroom setting is not feasible, the school district or charter school to submit an alternate plan for approval by the CDE, before the start of the school year, to offer a virtual or distance course option. Requires the computer science course to be listed as an option in the school's course catalog.

5) Requires school districts and charter schools to make efforts to increase the computer science education course enrollment of female students, students with disabilities, students who belong to ethnic and racial groups, and students eligible for free or reduced-priced meals that are underrepresented in the field of computer science.

6) Requires, by June 30, 2026, and by each June 30 thereafter, each school district and charter school to submit to the CDE a report for the concluding academic year that includes all of the following:

    a) The names and course codes of computer science education courses offered in each school, including course descriptions and which computer science academic content standards are covered, to the extent that information is available.

    b) The number and percentage of students who enrolled in each computer science education course, disaggregated by each of the following:

        i) Gender;

        ii) Race and ethnicity;

        iii) Special education status;

        iv) English learner status;

        v) Eligibility for free and reduced-price meals; and

        vi) Grade level.

    c) The number of computer science teachers at each school, disaggregated by:

        i) Credential and certification, as applicable;

        ii) Gender; and

        iii) Race and ethnicity.

7) Requires the CDE to publicly post all of the following on its website:

    a) The names and course codes of computer science education courses offered in each school, disaggregated by school;

    b) The data required to be reported about students and teachers of computer science, aggregated to the statewide level; and

c) A list of computer science education course codes and names, including course descriptions and which courses align to the computer science academic content standards.

8) Requires the CDE to publicly post data consistent with any standards prescribed pursuant to the California Cradle-to-Career Data System.

**EXISTING LAW**:

1) Establishes requirements for graduation from high school, including three courses in English, two courses in mathematics, two courses in science, three courses in social studies, one course in visual or performing arts or world languages, two courses in physical education, and, commencing with the class of students graduating in the 2029-30 academic year, a one-semester course in ethnic studies.

2) Requires that, of the three courses in social studies, two must be year-long courses in United States history and geography, and in world history, culture, and geography, and that the remaining two are a one-semester course in American government and civics, and a one-semester course in economics.

3) Authorizes the governing board of a school district to require a student to complete additional coursework, beyond the courses required at the state level, in order to receive a diploma of graduation from high school.

4) Requires the Superintendent of Public Instruction (SPI) to convene a computer science strategic implementation advisory panel to develop recommendations for a computer science strategic implementation plan, and requires the panel to submit recommendations for a strategic plan to the State Board of Education (SBE) by January 15, 2019.

5) Requires the plan to include, at a minimum, recommendations on all of the following:

   a) Broadening the pool of teachers to teach computer science;

   b) Defining computer science education principles that meet the needs of students in all grades; and

   c) Ensuring that all students have access to quality computer science courses.

6) Requires the Instructional Quality Commission (IQC) to consider developing and recommending to the SBE, on or before July 31, 2019, computer science content standards for kindergarten and grades 1 to 12 pursuant to recommendations developed by a group of computer science experts.

7) States that if a school district requires more than two courses in mathematics for graduation from high school, the district may award a student up to one mathematics course credit for successfully completing a "category C" approved computer science course. (EC 51225.35)

8) Requires the California State University (CSU), and requests the University of California (UC), to develop guidelines for high school computer science courses that may be approved for the purposes of recognition for admission. (EC 66205.5)

9) Through regulation, authorizes holders of credentials in mathematics, business, and ITE, as well as holders of supplementary authorizations in computer science, to teach computer science. (California Code of Regulations, Title 5, Section 80005)

10) Establishes the Computer Science Supplementary Authorization Incentive Grant Program for the purpose of providing one-time grants to local educational agencies (LEAs) to support the preparation of credentialed teachers to earn a supplementary authorization in computer science and provide instruction in computer science coursework.

11) States that teachers participating in the Computer Science Supplementary Authorization Incentive Grant Program are eligible to receive an award of up $2,500 through the program. Authorizes LEAs to use grant funding for the purpose of paying teachers' costs of coursework, books, fees, and tuition, as applicable. Requires applicants for the program to provide a 100% match of grant funding, which may be in the form of release time or substitute teacher costs.

**FISCAL EFFECT**: This bill has been keyed a possible state-mandated local program by the Office of Legislative Counsel.

**COMMENTS**:

***Need for the bill.*** The author states, "From Silicon Valley to Biotech Beach, California is the undisputed cradle of innovation. However, far too many students grow up in the shadows of tech companies, yet do not have the opportunity to learn the skills they need to work there. As of 2023, California has 49,040 open computing jobs with an average salary of $115,754, yet there were only 9,339 graduates in computer science in 2020.

There are currently 27 states that already require all high schools to offer a course in computer science and Arkansas, Nebraska, Nevada, South Carolina, and Tennessee go even further requiring a computer science course for graduation. California has fallen behind these 27 other states when it comes to prioritizing access to computer science education, exacerbating educational inequities and the diversity gaps in tech.

According to the Kapor Center, 60% of high schools in California do not offer any computer science courses. Schools serving low-income communities are three times less likely to offer core computer science courses than schools serving high-income communities. Rural schools are two times less likely to offer computer science courses than urban schools. While 52% of high schools serving a greater proportion of White or Asian students offered computer science courses, only 34% of high schools serving high proportions of Black, Indigenous, Latinx, and Pacific Islander students, offered computer science courses. While young women comprise 49% of the high school population, they comprise only 30% of students taking computer science.

AB 1054 would ensure computer science education for all by requiring public high schools in California to offer at least one computer science education course with a phased in approach with final implementation by the 2027-28 school year. It is time to restore California as a leader and take the next step to ensure every high school student in California has access to computer science education, which will help close the gender and diversity gaps."

***Computer Science Strategic Implementation Plan emphasizes the need to improve access to computer science instruction.*** In May, 2019, the SBE adopted the California Computer Science Strategic Implementation Plan, which supported the goal that "all schools offer rigorous and relevant computer science education equitably and sustainably throughout grades K–12." The plan made numerous recommendations organized into three themes: Access and Equity, Educator Support, and Standards Implementation.

The plan recommended that school districts adopt a high school graduation requirement for computer science, aligned to the 9–12 core computer science standards that can be satisfied through a variety of ways: standalone computer science courses, interdisciplinary courses, or a portfolio of computational artifacts.

***Access to computer science education in California schools. Research points to problems of access,*** and enrollment disparities in, coursework in computer science. The author notes:

- 60% of high schools in California do not offer a single course in computer science. (Code.org, 2022)

- California lags behind the national average, and behind 41 other states, in the percentage of high schools offering at least one computer science course. (Code.org, 2022)

- 5% percent of the 1.9 million high school students in California are enrolled in a computer science course. (Kapor Center, 2021)

Disparities in enrollment by race, gender, and region were also highlighted in *The California Computer Science Access Report* (Kapor Center, 2021):

- 34% percent of schools serving high proportions of Black, Indigenous, Latinx, and Pacific Islander pupils offer computer science courses, compared to 52% of schools serving a greater proportion of White and Asian pupils.

- Schools serving low-income communities are three times less likely to offer core computer science courses, and over two times less likely to offer Advanced Placement courses, than schools serving high-income communities.

- While female pupils comprise 49% of the high school population, just 30% of pupils taking computer sciences courses are female.

- Rural schools are two times less likely to offer computer science courses than urban schools.

The author also notes that 27 other states currently require high schools to offer a computer science course, and 5 of those states require a computer science course for graduation from high school. (Kapor Center, 2021)

Data on some computer science offerings in secondary schools is shown below for the 2018-19 school year. ***The Committee may wish to consider*** that current course enrollment data more recent than 2018-19 is not posted on the CDE website and was not provided upon request.

| Course Name | Number of Schools | Courses Taught | Number of UC/CSU Courses | Female Enrollment | Male Enrollment | Total Enrollment |
|---|---|---|---|---|---|---|
| AP Computer science A | 199 | 329 | 302 | 2,324 | 5,508 | 7,832 |
| AP Computer science AB | 35 | 62 | 61 | 607 | 1,090 | 1,697 |
| AP Computer Science Principles | 152 | 265 | 249 | 2,123 | 4,527 | 6,650 |
| Computer programming | 194 | 468 | 80 | 2,865 | 5,315 | 8,180 |
| Computer science | 351 | 806 | 289 | 6,244 | 11,932 | 18,176 |
| Exploring Computer Science | 16 | 31 | 11 | 212 | 514 | 726 |
| IB Computer science | 7 | 18 | 16 | 102 | 328 | 430 |
| **Total** | **954** | **1,979** | **1,008** | **14,477** | **29,214** | **43,691** |

*Source: CDE*

According to a 2021 report by Code.org, the Computer Science Teachers Association, and the Expanding Computing Education Pathways Alliance, *2021 State of Computer Science Education* reported on Advanced Placement (AP) enrollment in computer science:

- Of the 32,263 AP computer science exams taken in California in 2018-19, 32% of the test takers identified as female;

- Black/African American students and Native Hawaiian/Pacific Islander students are both four times less likely than their white and Asian peers to take an AP computer science exam; and

- Hispanic students are three times less likely to take an AP computer science exam than their white and Asian peers.

***What is the subject of computer science in grades K-12?*** Computer Science is a relatively new field of study for K-12 education. The Computer Science Strategic Implementation Panel's draft report notes that there is some confusion over what constitutes computer science instruction in K-12 schools: "computer science is often misconstrued with other technological terminology such as computer literacy, educational technology, digital citizenship, and information technology. These areas focus more on the use of computing systems (e.g., learning to use word processing software). In contrast, computer science calls upon students to understand why and how computing technologies work, and then to build upon that conceptual knowledge by creating computational artifacts."

The state's new computer science standards, adopted in 2018, define computer science education as "the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, and their impact on society." The core concepts in computer science instruction are:

- Computing systems
- Networks and Information systems
- Data and Analysis
- Algorithms and Programming
- Impacts of Computing

According to the International Society for Technology in Education's report, *ISTE Standards for Computer Science Education,* the field of computer science will continue to rapidly evolve in sometimes unpredictable ways, and as such, plans for teaching computer science will also need the flexibility to continuously adapt.

***Recommended amendments. Staff recommends that this bill be amended*** as follows:

1) To conform to the Committee's policy on curriculum measures, instead of requiring the offering of courses in computer science, requiring that school districts and charter schools develop and adopt a plan to offer courses in computer science, by the schedule described in the bill.

2) Require school districts and charter schools to post this plan on their websites and make it available to the CDE upon request.

3) Technical and conforming changes.

***Related legislation.*** AB 1251 (Luz Rivas) of the 2023-24 Session, would establish a workgroup to determine which single subject credentials should authorize the teaching of computer science, and report recommendations to the Legislature.

AB 1853 (Berman) of the 2021-22 Session would have established the Computer Science Preservice Teacher Grant Program, administered by the CTC to award competitive grants to institutions of higher education (IHEs) to develop or expand K–12 computer science and computational thinking coursework for individuals seeking specified teaching credentials. This bill was held in the Assembly Appropriations Committee.

AB 2187 (Luz Rivas) of the 2021-22 Session would have established a UC Subject Matter Project in computer science. This bill was held in the Assembly Appropriations Committee.

AB 130 (Committee on Budget), Chapter 44, Statutes of 2021, established the Computer Science Supplementary Authorization Incentive Grant Program for the purpose of providing one-time grants to LEAs to support the preparation of credentialed teachers to earn a supplementary authorization in computer science and provide instruction in computer science coursework.

AB 128 (Committee on Budget), Chapter 21, Statutes of 2021, appropriated $5 million on a one-time basis to establish the Educator Workforce Investment Grant: Computer Science, and required the CDE to select an IHE or nonprofit organizations to provide professional learning for teachers and paraprofessionals statewide in strategies for providing high-quality instruction and computer science learning experiences aligned to the computer science content standards.

AB 498 (Quirk Silva) of the 2021-22 Session was substantially similar to AB 1932 of the 2019-20 Session. This bill was amended into a different jurisdiction and held in the Senate Appropriations Committee.

AB 1410 (Quirk Silva) of the 2019-2020 Session was substantially similar to AB 1932 of the 2019-20 Session. This bill was held in the Senate Appropriations Committee.

AB 1932 (Quirk-Silva) of the 2019-20 Session would have established the Computer Science Access Initiative, to improve students' access to instruction in computer science by increasing the number of teachers who are authorized and trained to provide computer science instruction in California public schools. This bill was held in the Assembly Education Committee.

AB 2309 (Berman) of the 2019-20 Session would have required the Commission on Teacher Credentialing (CTC) to develop and implement a program to award competitive grants to postsecondary educational institutions for the development of preservice credential programs for individuals seeking a teaching credential, and the expansion of programs of study for single subject or multiple subject credentialed teachers seeking a supplementary authorization in computer science. This bill was held in the Assembly Education Committee.

AB 2274 (Berman) of the 2019-20 Session would have required the CDE to annually compile and post on its website a report on computer science courses, course enrollment, and teachers of computer science courses, for the 2019-20 school year and each subsequent school year. This bill was held in the Assembly Education Committee.

AB 1967 (Luz Rivas) of the 2019-20 Session would have established a UC Subject Matter Project in Computer Science. This bill was held in the Assembly Higher Education Committee.

AB 20 (Berman) of the 2019-20 Session would have established a Computer Science Coordinator position at the CDE. This bill was held in the Assembly Appropriations Committee.

AB 52 (Berman) of the 2019-20 Session would have required the computer science strategic implementation plan to be regularly updated. This bill was held in the Assembly Appropriations Committee.

AB 182 (Luz Rivas) of the 2019-20 Session would have required the CTC to establish a workgroup, comprised of certain members, to determine if the development of a single subject computer science credential is warranted and, if so, to consider requirements for that credential. This bill was held in the Assembly Appropriations Committee.

AB 1410 (Quirk-Silva and O'Donnell) of the 2019-20 Session would have established the Computer Science Access Initiative, to provide grants to LEAs for the purpose of increasing the number of teachers authorized and trained to instruct students in computer science. This bill was held in the Assembly Appropriations Committee.

SB 675 (Chang) of the 2019-20 Session would have enacted the Computer Occupations and Developing Education (CODE) Act, pursuant to which the SBE would administer a grant program promoting the teaching of computer science courses in the public secondary schools. This bill was held in the Senate Governmental Organization Committee.

AB 2329 (Bonilla), Chapter 693, Statutes of 2016, requires the SPI to convene a computer science strategic implementation advisory panel to develop recommendations for a computer science strategic implementation plan.

AB 2275 (Dababneh) of the 2015-16 Session would have authorized a person who holds a single subject teaching credential in business, industrial and technology education, mathematics, or science or a designated subjects career technical education teaching credential to teach courses in computer science to all students. This bill was held in the Assembly Education Committee.

AB 1539 (Hagman, 2014), Chapter 876, Statutes of 2014, requires the IQC to consider developing and recommending to the SBE, on or before July 31, 2019, computer science content standards for kindergarten and grades 1 to 12, pursuant to recommendations developed by a group of computer science experts.

AB 1764 (Olsen), Chapter 888, Statutes of 2014, states that if a school district requires more than two courses in mathematics for graduation from high school, the district may award a student up to one mathematics course credit.

**REGISTERED SUPPORT / OPPOSITION**:

**Support**

21st Century Alliance
Amazon
American Association of University Women, San Jose
BSA the Software Alliance
California Chamber of Commerce
California Stem Network
Children Now
Code.org
Intel Corporation
Los Angeles Area Chamber of Commerce
Microsoft Corporation
North Bay Leadership Council
Orange County Department of Education
Regional Economic Association Leaders (R.E.A.L.) Coalition
Riverside County Office of Education
Silicon Valley Leadership Group
Snap, Inc.
TechNet
The College Board
Unite-LA
Walnut Creek Chamber of Commerce & Visitors Bureau

**Opposition**

None on file

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