Date of Hearing: March 26, 2025

ASSEMBLY COMMITTEE ON EDUCATION
Al Muratsuchi, Chair
AB 887 (Berman) – As Introduced February 19, 2025

**SUBJECT**: Pupil instruction: high schools: computer science courses: implementation guide

**SUMMARY**: Requires the governing bodies of school districts and charter schools with students enrolled in grades 9 to 12 to, by January 1, 2027, adopt a plan to offer courses in computer science, and requires the California Department of Education (CDE) to collect data on computer science course enrollment and develop a computer science implementation guide. Specifically, **this bill**:

1) Requires, by January 1, 2027, the governing board of each school district, and the governing body of each charter school, maintaining any of grades 9 to 12, to adopt a plan at a regularly scheduled public meeting to offer at least one course in computer science in accordance with all of the following:

    a) Commencing with the 2027–28 school year, at least one high school per school district offers a computer science course. Permits school districts maintaining only one high school instead offer a computer science course by no later than the 2028–29 school year;

    b) Commencing with the 2028–29 school year, all charter schools maintaining any of grades 9 to 12, offer a computer science course;

    c) Commencing with the 2028–29 school year, at least 50% of the high schools per school district offer a computer science course; and

    d) Commencing with the 2029–30 school year, all high schools in a school district offer a computer science course.

2) Requires school districts and charter schools to post the plan on their websites and otherwise make them available upon the request of the CDE.

3) Requires, on or before May 31, 2027, and annually thereafter until each high school in a school district or each charter school maintaining grades 9 to 12 to offer a computer science course, the governing board of a school district and the governing body of a charter school to review the required plan at a regularly scheduled public meeting and report to the public on its progress in implementing the plan.

4) Requires that if a traditional classroom setting for a computer science course is not feasible, the school district or charter school include its plan to offer a virtual or distance course option in the required plan, and 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 describe in the plan its planned efforts to increase the computer science course enrollment of female pupils, pupils with disabilities,

pupils who belong to ethnic and racial groups, and pupils eligible for free or reduced-priced meals, that are underrepresented in the field of computer science.

6) Requires the CDE, on or before June 30, 2028, and annually thereafter, to publicly post the following course-related data for grades 9 to 12, inclusive, on its website, disaggregated at the state, county, school district, and school levels, for computer science courses:

   a) The names and course codes of computer science courses that pupils are enrolled in at each school; and

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

      i) Gender;

      ii) Race and ethnicity;

      iii) Special education status;

      iv) English learner status;

      v) Socioeconomically disadvantaged status, including pupils who are eligible for free or reduced-price meals; and

      vi) Grade level.

7) Establishes the following definitions for purposes of the act:

   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 course" means a computer science course that is aligned to the computer science academic content standards and in which pupils 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.

8) Requires, by July 1, 2026, the CDE, under the direction of the California Computer Science Coordinator, to develop a computer science implementation guide, which would include information on all of the following regarding computer science standards-aligned courses:

   a) Varied computer science course options to best meet local capacity and context, including, but not limited to, computer science courses taught as part of a course that may satisfy an A–G requirement or that may be integrated into another content area, which may include career technical education;

   b) Credentialing pathways;

c) Existing funding sources for professional learning;

d) Case studies and best practices from California high schools;

e) References to computer science standards-aligned curriculum resources, including, but not limited to, open-source options; and

f) Open source teacher-ready resources for utilization in computer science courses.

9) Requires the CDE, in developing the guide, to input from stakeholders with relevant expertise and experience in computer science education.

10) Encourages school districts, county offices of education, and charter schools to review the computer science implementation guide.

**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 or career technical education (CTE), 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. (Education Code (EC) 51225.3)

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. (EC 51225.3)

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. (EC 51225.3)

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 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. (EC 60605.4)

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 Industrial and Technology Education (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 LEAs to support the preparation of credentialed teachers to earn a supplementary authorization in computer science and provide instruction in computer science coursework. Authorizes LEAs to use grant funding to pay 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. (AB 130 (Committee on Budget), Chapter 44, Statutes of 2021)

**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, "Thirty-one states already require every high school to offer a computer science course. Arkansas, Nebraska, Nevada, North Carolina, North Dakota, Rhode Island, South Carolina, and Tennessee go even further requiring a computer science course for high school graduation. California has fallen behind these other states when it comes to prioritizing access to computer science education, exacerbating educational inequities and diversity gaps.

According to the Kapor Center, 55% 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.

From Silicon Valley to Biotech Beach, California is the undisputed cradle of innovation, with over 45,000 high paying computing jobs open and unfilled here in California. Too many students grow up in the shadows of tech companies that are creating world-changing technology and offering good-paying careers, but they are not even getting the opportunity to learn the skills they

need to one day work there. However, the reality is that computer science is about so much more than just Silicon Valley tech jobs. Computers and technology are an integral part of our everyday life and are relied upon in every industry, in every corner of California.

AB 887 would ensure computer science for all by requiring public high schools in California to offer at least one computer science course with a phased in approach with final implementation by the 2028-29 school year. It also would create a computer science high school graduation requirement by the 2030-2031 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 to, 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); and

- 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 students offer computer science courses, compared to 52% of schools serving a greater proportion of White and Asian students;

- 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 students comprise 49% of the high school population, just 30% of students taking computer science courses are female; and

- 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)

***We don't know how many students are enrolled in computer science***. Data on some computer science offerings in secondary schools is shown below for the 2018-19 school year. ***However, the Committee may wish to consider*** that the public does not have access to current public information on course enrollment or any other secondary subject, because enrollment data more recent than 2018-19 is not posted on the CDE website.

| Course Name | Number of Schools | Courses Taught | Number of UC/CSU Courses | Female Enrollment | Male Enrollment | Total Enrollment |
|---|---|---|---|---|---|---|
| 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*

Data provided by the College Board shows the following trends in Advanced Placement (AP) computer science course offerings:

| | 2020 | | 2021 | | 2022 | | 2023 | | 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | # of HS Schools | Percent | # of HS Schools | Percent | # of HS Schools | Percent | # of HS Schools | Percent | # of HS Schools | Percent |
| Both | 246 | 13.4 | 283 | 15.4 | 308 | 15.4 | 308 | 15.4 | 299 | 14.9 |
| CSA only | 112 | 6.1 | 123 | 6.7 | 101 | 5 | 102 | 5.1 | 119 | 5.9 |
| CSP only | 277 | 15.1 | 254 | 13.8 | 255 | 12.7 | 276 | 13.8 | 293 | 14.6 |
| Neither | 1202 | 65.4 | 1177 | 64.1 | 1338 | 66.8 | 1316 | 65.7 | 1300 | 64.6 |
| Total | 1837 | 100 | 1837 | 100 | 2002 | 100 | 2002 | 100 | 2011 | 100 |

*Source: College Board*

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 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 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; and
- 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.

***Computer Science content standards.*** In 2018, the SBE adopted California's first set of computer science standards for grades K-12. The standards are based on the five computer science core concepts and seven core practices:

| Core Concepts | Core Practices |
|---|---|
| Computing systems | Fostering an inclusive computing culture |
| Networks and the internet | Collaborating around computing |
| Data and analysis | Recognizing and defining computational problems |
| Algorithms and programming | Developing and using abstractions |
| Impacts of computing | Creating computational artifacts |
| | Testing and refining computational artifacts |
| | Communicating about computing |

Each standard includes a descriptive statement as well as examples for classroom application. As students progress through the standards from grades K–12, the standards call for students to

build conceptual knowledge through active engagement in creative problem solving activities with an awareness of cultural and societal contexts. Computer science core concepts and practices in the standards are vertically aligned, coherent across grades, and designed in developmentally appropriate grade spans. The 9–12 grade span also includes an additional set of standards, referred to as 9–12 Specialty, which provides options for extending a pathway in computer science with content containing increased complexity and depth, and which may be used to create electives that are outside an introductory course.

In addition, the standards contain significant themes of equity, "powerful ideas," computational thinking, and breadth of application.

***Computer Science teaching workforce constrains access to courses.*** The California Computer Science Strategic Implementation Plan notes that "to grow K–12 computer science education in California, the state will need to increase the number of teachers qualified to teach computer science. Supporting more educators to teach computer science would involve a multi-pronged approach that attends to credentialing, new teacher recruitment, professional learning for teachers, administrators, and counselors regarding the California computer science standards, and institutional and financial support."

California has three single subject teaching credentials (mathematics, business, and industrial and technology education) which authorize teachers to provide instruction in computer science. The Commission on Teacher Credentialing (CTC) issues supplementary authorizations in computer science which also authorize a teacher holding another credential to teach computer science.

In 2016 the CTC modified their Computer Concepts and Applications authorization to reflect a change in focus from teaching basic computer use, keyboarding, and software application to broader preparation in computer science education. The CTC also changed the name of the authorization to "Computer Science."

To obtain a supplementary authorization in computer science, teachers must complete 20 semester units or 10 upper division semester units, or the equivalent quarter units, of non-remedial coursework in computer science. They may also qualify by holding a collegiate major from a regionally accredited college or university in a subject directly related to the subject to be listed on the credential. The coursework must cover the following content areas:

- Computer Programming;
- Data structures and algorithms;
- Digital devices, systems and networks:
- Software design;
- Impacts of computing; and
- The balance of the units may be in any course that falls within the academic department for that subject category.

AB 1251 (Luz Rivas), Chapter 834, Statutes of 2023, establishes a workgroup to determine which single subject credentials should authorize the teaching of computer science, and to report recommendations to the Legislature. The requirements of this bill were contingent upon an appropriation, and as none has been made for this purpose, the CTC reports that the workgroup has not been formed.

***Arguments in support.*** Project Lead the Way writes, "Computer science education is necessary in today's increasingly digitized world, especially with the rise of artificial intelligence into everyday life. It is crucial that students know not just how to use technology, but how to create it. Every student deserves to be equipped with the knowledge, tools, and resources to successfully participate and thrive in modern society. As technology continues to expand, today's students need accessible, culturally relevant computer science education. Computer science teaches students how to meaningfully engage and affords them the opportunity to compete globally in an increasingly technology-driven world. Part of developing a well-informed citizenry is helping young people understand and approach computing technology while thinking critically about its potential and impacts. The time is now to pass AB 887, a bill that will demonstrate the state's commitment to equitable, high-quality computer science education and equip all California students for success."

***Arguments in opposition.*** The Association of California School Administrators writes, "While we understand the importance of computer science education in preparing students for the future, we are deeply concerned about the lack of qualified educators to fulfill this requirement. Currently, California is facing a severe shortage of teachers, particularly in specialized fields such as computer science. Enforcing a computer science requirement without sufficient educators to deliver high-quality instruction would be counterproductive and undermine the intended purpose of the bill. This could result in a superficial understanding of the subject matter, which would be detrimental to students' future success in pursuing careers or higher education in the field.

Furthermore, school leaders are already inundated with countless plans, reports, and administrative tasks that demand their time and attention. These responsibilities take away from the critical work of directly supporting educators and students. The added pressure of implementing a new requirement, such as AB 887, without the proper resources or personnel would further stretch administrators thin, potentially leading to a decline in the quality of support provided to both educators and students.

In light of these concerns, ACSA requests an exemption for schools if they can project that they are unable to secure qualified educators or the necessary resources to teach computer science. This exemption would ensure that schools are not penalized for circumstances beyond their control and would prevent the implementation of a requirement that cannot be effectively fulfilled."

***Related legislation***. AB 2097 (Berman) of the 2023-24 Session was substantially similar to this bill. It was held in the Senate Appropriations Committee.

AB 1054 (Berman) of the 2023-24 Session was substantially similar to this bill. It was held in the Senate Appropriations Committee.

AB 1251 (Luz Rivas), Chapter 834, Statutes of 2023, establishes a workgroup to determine which single subject credentials should authorize the teaching of computer science, and to 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 institution of higher education 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**

2sigma School INC
California Chamber of Commerce
Microsoft Corporation
Monterey County Office of Education
National AI Youth Council
Project Lead the Way
Reach University
Silicon Valley Leadership Group

**Opposition**

Association of California School Administrators

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