



**Association for
Computing Machinery**

Advancing Computing as a Science & Profession

NEWS RELEASE

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WORLD’S LEADING TECHNOLOGY ASSOCIATIONS PUBLISH COMPREHENSIVE CURRICULAR GUIDELINES FOR COMPUTER SCIENCE AT THE UNDERGRADUATE LEVEL

Growing Importance of Artificial Intelligence Reflected in CS2023 Curricular Guidelines

New York, NY, June 5, 2024 – ACM, the Association for Computing Machinery, has joined with the IEEE Computer Society (IEEE-CS) and the Association for the Advancement of Artificial Intelligence (AAAI) to develop “[Computer Science Curricula 2023](#)” (CS2023). CS2023 provides a comprehensive guide outlining the knowledge and competencies students should attain for degrees in computer science and related disciplines at the undergraduate level.

Establishing uniform curricular guidelines for computer science disciplines is viewed as being essential to the ongoing vitality of the field and the future success of the students who study it. Shared global curricula ensures that students develop the knowledge and skills they need to succeed as they graduate to become industry practitioners, researchers, or educators. Additionally, by supporting consistency in the field across the world, the curricular guidelines enable efficient global collaboration—whether among professionals working across borders for an international company, or among academics from different nations coming together for a research project.

Customarily, these guidelines are updated every ten years. CS2023 builds on CS2013, the most recent global curriculum framework developed by ACM and IEEE-CS, the world’s two largest associations of computing professionals. ACM and IEEE-CS have consistently focused on curating content from the world’s foremost experts for the creation of curricular guidelines, and with the rapid expansion of AI since CS2023, the addition of AAAI to the developing body was both essential and welcome.

New and Noteworthy additions of the CS2023 report include:

- The addition of AAAI as a core partner of CS2023 reflects the growing importance of artificial intelligence as a discipline, as well as how AI is disrupting the teaching of computer science.

- Because computing touches so many aspects of personal and public life, CS2023 goes beyond simply outlining technical competencies to include a knowledge unit called Society, Ethics, and the Profession (SEP) and incorporating it in most other knowledge areas to encourage educators and students to consider the social aspects of their work.
- To meet the disciplinary demands of artificial intelligence and machine learning, mathematical and statistical requirements have been increased throughout CS2023, but individually identified for each knowledge area so that educators can accommodate the needs of students with varying levels of mathematical background.
- CS2023 is designed to be a primarily online resource at <https://csed.acm.org/>, both for utility and so the curricular guidelines can be updated more frequently to keep pace with the rapid changes in the field.

“So much has changed in computing since we issued the last curricular guidelines in 2013,” explained Amruth Kumar, Professor, Ramapo College, and Steering Committee Co-Chair, CS2023. “While the core skills and competencies that we outlined in 2013 form the foundation of this new work, we were painstaking in our effort to make sure that we reflect where computing is today. We also tried to emphasize a whole solution approach in terms of addressing issues of Society, Ethics, and the Profession, and a whole person approach in terms of emphasizing the need for students to develop professional dispositions. Finally, from the outset, we envisioned this report as a living document that will be regularly updated and can be accessed by computer science educators on an ongoing basis.”

The development of CS2023 was guided by a global Steering Committee of 17 computing professionals who were drawn from academia and industry through a selective application process. The project began in 2021 by analyzing the results of a purpose-built computing community survey that included 427 academic and 865 industry respondents from around the world. Each Steering Committee member then led the development of the curricular guidelines for a specific knowledge area. Each knowledge area reflects a core discipline within computer science, such as security, data management, and foundations of programming languages. The final version of CS2023 includes community feedback collected through additional surveys, various ACM Special Interest Groups and other conferences and venues, and an online portal for open and general comments.

“Curricular frameworks must simultaneously meet the needs of educational institutions and industry and are most valuable when their development includes experts from these types of organizations and the collaboration of the wider computer science community,” said Alison Derbenwick Miller, Co-Chair, ACM Education Board. “Throughout the development of CS2023, ACM and our partners worked to ensure broad involvement, including industry professionals. We focused on curricular guidelines—what students should know—as well as curricular practices and why students need specific knowledge. In addition, we were excited to be able to include

supplemental materials such as curricular practice articles, which are particularly important to address emerging technologies in a rapidly changing field like computer science.”

CS2023 also noted the specific challenges computer science educators have faced in recent years, including faculty recruitment and retention, AI generation of code and its implications, and how educators can manage workload challenges in the face of explosive enrollments.

“CS2023 is the culmination of three years of dedication and hard work by many subject matter experts,” added Elizabeth K. Hawthorne, Professor, Rider University and Co-Chair, ACM Education Board. “We thank everyone who volunteered their time in such an important effort—from the Steering Committee and taskforce members to the reviewers, and everyone who offered guidance and feedback along the way. We know that computer science educators will see this as a critical resource that will move our field and students forward.”

About ACM

[ACM, the Association for Computing Machinery](#), is the world’s largest educational and scientific computing society, uniting computing educators, researchers, and professionals to inspire dialogue, share resources, and address the field’s challenges. ACM strengthens the computing profession’s collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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