

Cybersecurity Engineering BS Degree Curricula Design Framework and Assessment

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Abstract : After 9/11, there will only be cyberwars. The cyberwars increase in intensity the country's cybersecurity workforce's hiring and retention issues. Currently, many organizations have unfilled cybersecurity positions, and to a lesser degree, their cybersecurity teams are understaffed. Therefore, there is a critical need to develop a new program to help meet the market demand for cybersecurity engineers (CYSE) and personnel. Coppin State University in the United States was responsible for developing a cybersecurity engineering BS degree program. The CYSE curriculum design methodology consisted of three parts. First, the ACM Cross-Cutting Concepts standard's pervasive framework helped curriculum designers and students explore connections among the core courses' knowledge areas and reinforce the security mindset conveyed in them. Second, the core course context was created to assist students in resolving security issues in authentic cyber situations involving cyber security systems in various aspects of industrial work while adhering to the NIST standards framework. The last part of the CYSE curriculum design aspect was the institutional student learning outcomes (SLOs) integrated and aligned in content courses, representing more detailed outcomes and emphasizing what learners can do over merely what they know. The CYSE program's core courses express competencies and learning outcomes using action verbs from Bloom's Revised Taxonomy. This aspect of the CYSE BS degree program's design is based on these three pillars: the ACM, NIST, and SLO standards, which all CYSE curriculum designers should know. This unique CYSE curriculum design methodology will address how students and the CYSE program will be assessed and evaluated. It is also critical that educators, program managers, and students understand the importance of staying current in this fast-paced CYSE field.

Keywords : cyber security, cybersecurity engineering, systems engineering, NIST standards, physical systems

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