

## Teacher Summary: Physical Security

This document provides instructor guidelines for one of the ten integrated curriculum projects developed for the NSF-funded Necessary Skills Now (NSN) project (award #1501990). The NSN project partners consist of CORD and three national centers supported through the NSF's Advanced Technological Education (ATE) program: National Center for Systems Security and Information Assurance (CSSIA), Florida Advanced Technological Education Center (FLATE), and South Carolina Advanced Technological Education National Resource Center (SC ATE). The NSN project is designed to integrate employability skills into technical exercises, activities, and labs. The project partners created self-contained instructional modules vertically aligned to associate degree programs in **mechatronics/automation in manufacturing** and **cybersecurity in information technology**. (The activities described in this document support courses in cybersecurity.) Six categories of employability skills, repeatedly mentioned in workforce surveys and research reports, served as the focus of the integrated curriculum:

<i>skill category</i> <b>1</b> <b>TEAMWORK</b>	<i>skill category</i> <b>2</b> <b>PROBLEM SOLVING</b>	<i>skill category</i> <b>3</b> <b>VERBAL COMMUNICATION</b>
<i>skill category</i> <b>4</b> <b>WRITTEN COMMUNICATION</b>	<i>skill category</i> <b>5</b> <b>DEPENDABILITY/WORK ETHIC</b>	<i>skill category</i> <b>6</b> <b>PLANNING AND ORGANIZING</b>

This project addresses the skills highlighted above.

Faculty Resources: Physical Security Project	
Section	Content
Project Overview	<p><b>Purpose:</b> This project incorporates employability skills (teamwork, problem solving, verbal communication, and planning and organizing skills) into an exercise that focuses on creating a secure physical environment for a student data center.</p> <p><b>Courses for Implementation:</b> Cybersecurity Essentials, Security+, Network Security</p> <p><b>Key Terms:</b> physical security</p>
Discussion	<p>STATE University is a public four-year university offering a full array of graduate and undergraduate programs, including information technology (IT), information security (INFOSEC), and information assurance (IA). Students built and maintain a classroom network that supports coursework and prepares students for security-based competitions. The classroom network has been active for two years and is contained within the classroom, where there have been minor incidents of sabotage and component theft. The department gave the students permission to expand the scope of the classroom network to a <b>student data center</b>, to help expand student knowledge and skills <i>outside the classroom</i>. However, with the expansion to include various levels of remote access, the administration asked for recommendations that will address the <b>physical security</b> for your student-run data center, and take into consideration the past incidents that have occurred.</p> <p>If successful, the university hopes to expand this data center to include the growing number of students participating in security competitions—perhaps expanding to a campus-wide availability. Before taking this step, though, your team must develop and present your recommendations to provide adequate physical security for the network (layer assigned to you). Your recommended network architecture should include technologies to provide 1) secure local access, 2) secure wireless access on campus, and 3) secure access from off campus. These additional access modes must maintain the privacy of users as well as the security of the data center.</p> <p>Watch the video <a href="#">Physical Security Prevention Methods</a> (6:43)</p>
Objectives	<p>Student Learning Objectives (Career and Technical, employability, etc.)</p> <ol style="list-style-type: none"> <li><b>Technical</b> – Students will provide recommendations to physically secure a student data center: 1) local access, 2) wireless access, and 3) access from off-campus.</li> <li><b>Teamwork</b> – Students will work constructively and respectfully in teams to construct and present a plan to provide physical security measures for a student data center.</li> <li><b>Problem Solving</b> – Each student will identify potential problem areas and suggested solutions to improve the physical security for a student data center.</li> <li><b>Verbal Communication</b> – Each student will demonstrate effective verbal communication skills to present, explain, answer questions about, and refine recommended plans to administration representatives.</li> <li><b>Planning and Organizing</b> – Students will collaborate with classmates to organize and plan a set of thorough recommendations to maintain and verify the physical security of a student data center.</li> </ol>

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Teacher Strategies	<p>Step 1 – Watch the video <i>Physical Security Prevention Methods</i>. (6:43)</p> <p>Step 2 – Review the four basic layers required for proper physical security. (15 min.)</p> <p>Step 3 – Divide the class into four (4) teams. Distribute all student handouts, research materials, and other resource materials (or links) to each team. <b>Assign to each team one of the layers of physical security: design, control, detection, or identification.</b> Each team will research its assigned layer and recommend measures that should be considered to <b>physically secure</b> that layer of the student data center. (30 min)</p> <p>Step 4 – Each team is required to give a 10–15 minute presentation, with each member participating in some fashion, outlining the team’s plan to ensure the physical security of the student data center. The presentation should include visual aids, using tools such as PowerPoint, PowToon, Apple Keynote or Prezi. (60–90 min total)</p> <p>Step 5 – After all presentations have been made, discuss as a class each of the layers’ proposed physical security measures. Identify any gaps, and ask the team members to suggest remedies. (30 min)</p>
Expected/Result and Solutions	<p>The four teams will show evidence of working together to brainstorm and settle on ideas, develop the agreed-upon ideas for the team’s assigned layer, and document the team’s recommendations to ensure the physical security of a proposed student data center. Each layer will be expected to address topics such as:</p> <ul style="list-style-type: none"> <li>• <b>Design:</b> HVAC, Internet access, physical locks, perimeter security (fences, monitoring), and so forth.</li> <li>• <b>Control:</b> Access control system, equipment control, and so forth.</li> <li>• <b>Detection:</b> Cameras, guards, logging, and so forth.</li> <li>• <b>Identification:</b> Visitor and contractor policies, equipment labeling, administration, and so forth.</li> </ul> <p>Students will also then demonstrate oral communication and presentation skills by presenting their recommendations to you and the rest of the class, and respond to questions for clarification from you and other “administrators.”</p>
Extension Options	<p>Ask students to supply cost estimates (short-term and long-term) for each part of their proposals. Do the cost figures provoke any changes to their plan? Will the administration be as likely to accept the recommendations knowing the estimated costs?</p>
Equipment/Materials	<p>Computer system with Internet access</p> <p>Microsoft PowerPoint, Apple Keynote, Powtoon, or Prezi</p>
Background Materials	<ol style="list-style-type: none"> <li>1. Suggested Video: <ul style="list-style-type: none"> <li><a href="#">Physical Security Prevention Methods</a> (6:43)</li> </ul> </li> <li>2. Suggested Website Links: <ol style="list-style-type: none"> <li>a. <a href="#">The Four Necessary Basic Layers Required for Proper Physical Security</a></li> </ol> </li> </ol>

Faculty Resources: Physical Security Project	
Section	Content
	a. <a href="#">Physical Security and Why It Is Important</a> (PDF, copy and paste URL into browser) b. <a href="#">Best Practices for Designing Your Physical Security Infrastructure System</a> c. <a href="#">Protecting Your System: Physical Security</a> d. <a href="#">Data Center Physical Security Checklist</a> (PDF, copy and paste URL into browser)
Student Handouts	Student_PhysicalSecurity.docx
Assessment	Physical Security Project Rubric Word Document <ul style="list-style-type: none"> <li>• Teamwork Rubric</li> <li>• Problem Solving Rubric</li> <li>• Verbal Communication Rubric</li> <li>• Planning and Organizing Rubric</li> <li>• Technical Rubric</li> </ul>