IOWA STATE UNIVERSITY
Department of Electrical and Computer Engineering

Senior Design Project Proposal Form

Client/Company/Organization: Gelli Ravikumar

Submitter Name: Gelli Ravikumar **Email:** gelli@iastate.edu

Project Contact: Gelli Ravikumar **Email:** gelli@iastate.edu

Project Title:

Grid-SIEM: Cybersecurity for Power Grid using SIEM tools and Machine/Deep Learning tools

Project Abstract:

This project aims to build a platform for artificial intelligence (AI)-integrated cybersecurity for power grids. Security information and event management (SIEM) tool is a widely used technology for traditional information security. In this project, the open-source SIEM software "SecurityOnion" can be used to build a platform to integrate with the power system monitoring and control environment, which we refer to as Grid-SIEM. The real-world problem is the power system monitoring and control environment is vulnerable to cyberattacks, and this project aims to build a cyber defense against it. Once the Grid-SIEM is designed, students will be required to develop Machine/Deep Learning-based algorithms for cyberattack data analytics. Students will get access to the PowerCyber lab and the power system monitoring and control environment for integrating SecurityOnion and conducting cyberattack and defense experiments. Students will receive all the required materials for working on SecurityOnion software and the cybersecurity and power system testbed. Programming experience and a Linux working environment are two essential prerequisites. At the end of the project, you will learn cyberattacks, SIEM, and Machine/Deep Learning. This software-based project includes the following modules to be developed: 1) Understand SecurityOnion and integrate to power system monitoring and control testbed -- Grid-SIEM, and 2) Develop and simulate cyberattacks, and build ML/DL-based analytics.

Expected Deliverables:

1) Software codes and 2) Technical project report.

Specialized Resources Provided by Client:

PowerCyber private cloud testbed hosted at Iowa State University

Anticipated Cost: _____ **Financial Resources Provided by Client:** NA

Preferred Students for the Project:

- ☑ Electrical Engineering
- ☑ Computer Engineering
- ☑ Software Engineering
- ☑ Cyber Security Engineering
- ☐ Other:

Other Special Skills: GitLab, Dockers, Understanding Cybersecurity, Wireshark

Anticipated Client Interaction (estimate):

- ☑ 1 meeting per week

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☑ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 1 meeting per month
☐ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 2 or more meetings per month
☐ In person, ☐ Over the phone, ☐ Web / video conferencing
☐ 1 meeting per semester
☐ In person, ☐ Over the phone, ☐ Web / video conferencing

Meeting ABET Criteria

Please rate the following statements as they relate to your proposed project:

	0 – Not at all	*1 – A Little*	*2 – Somewhat*	*3 – A Lot*	*4 – Completely*
On this project, students will need to apply knowledge of mathematics, science, and engineering	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4
This project gives students an opportunity to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4
This project involves students from a variety of programs, i.e., CprE, EE, and SE	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4
This project requires students to identify, formulate, and solve engineering problems	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4
This project gives students an opportunity to use the techniques, skills, and modern engineering tools necessary for engineering practice	☐ 0	☐ 1	☐ 2	☐ 3	☑ 4

Project Approval – *for use by ECpE Senior Design Committee*

☑ Approved: sdmay24-proj042
☐ Project Assigned: _____
☐ Advisor(s) Assigned: _____
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