CprE 539x: Cyber Physical System Security for Smart Grid

Syllabus:
- Cyber security concepts
- SCADA systems: Introduction to power grid automation concepts
- Cyber Risk modeling, impact analysis, mitigation
- Security issues in Wide-Area Monitoring, Protection, and Control (WAMPAC)
- Security and Privacy issues in Advanced Metering Infrastructure (AMI)
- Cyber security standards and best practices
- Cyber-Physical test-bed experimental studies

Course material:
- A set of research papers and technical reports
- A set of cyber security reports and standards from Federal Agencies: DOE, DHS, NIST, NERC, and utility/security industry
- Set of Lab experiments using PowerCyber Security Test-bed

Grading policy:
- **Exam: 30%**
  One mid-term exam and one final exam.

  - **Homework: 20%**
    3-4 homeworks involving a combination of problem solving and paper reading/presentation assignments.

  - **Lab experiments: 30%**
    Cyber security tool usage, vulnerability assessment.

  - **Term project: 20%**
    Interdisciplinary team project, cyber-physical security, attack-defense evaluation. Term project includes: project plan, project progress review, and final evaluation that include demonstration.

Learning Outcomes:
- Demonstrate understanding of basic cyber security concepts
- Demonstrate understanding of power grid SCADA system
- Demonstrate understanding of cyber threats, vulnerabilities, and consequences to power grid
- Demonstrate understanding of cyber risk assessment
- Demonstrate hands-on usage of basic security tools
- Ability to independently read research and technical articles in this area
- Ability to work in an interdisciplinary team
- Ability to formulate, implement, evaluate cyber-attacks, and security solutions
- Ability to prepare technical report and make technical presentations