CprE 539 syllabus

Catalog Description
Introduction to cybersecurity, cyber-physical system (CPS), and smart grid automation technologies; supervisory control and data acquisition (SCADA) systems; cyber risk modeling, vulnerability analysis, impact analysis, defense, and mitigation techniques; cybersecurity of wide-area monitoring, protection, and control; security and privacy in advanced metering infrastructure (AMI), cybersecurity compliance and best practices, CPS security test-beds, and attack-defense hands-on laboratory experiments.

Course Outline
· Introduction to SCADA and Information security
· Risk Assessment & Mitigation
· Cybersecurity Testbed and Vulnerability Assessment
· Cybersecurity of Wide-Area Monitoring, Protection, and Control
· SCADA protocols Security
· Countermeasures – Anomaly detection, Moving Target Defense
· Cybersecurity Standards (NERC CIP) & Best practices (GridEx)
· Cybersecurity Capability Maturity Model
· Attack surface (exposure) analysis
· Emerging topics in smart grid cybersecurity
o DER cybersecurity
o Machine Learning (ML) applications in grid cybersecurity
o EPRI NESCOR and MITRE Att@ck frameworks
o Supply chain security for energy delivery system

Hands-on, Team-based Learning: The course involves team-based learning opportunities via lab experiments and course project, which will leverage the PowerCyber Testbed, a testbed platform that incorporates industry-grade software, hardware, cybersecurity attacks and defense tools.