



# AVS ENGINEERING COLLEGE



We Create Responsible Engineers

(Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai | Recognized Under 2(f) of UGC Act 1956)

Military Road, Ammapet, Salem - 636 003.

## THE CENTRE FOR COMPETENCY DEVELOPMENT



The Center of Competency Development in Schneider Electric Incubation centre provides technical knowledge, researchers, students and industry professionals with access to cutting-edge technology , tools and resources to help them develop new and innovative solution.

# ***SMART GRID OPTIMIZATION***



- 1. Improved Efficiency:*** Minimize energy losses, reduce peak demand, and optimize energy distribution.
- 2. Increased Reliability:*** Predict and prevent power outages, and quickly restore service when outages occur.
- 3. Renewable Energy Integration:*** Seamlessly integrate solar, wind, and other renewable energy sources into the grid.
- 4. Demand Response:*** Manage energy consumption in response to changes in supply and demand.
- 5. Cost Savings:*** Reduce operational costs, minimize waste, and optimize energy storage.

# ***ENERGY MANAGEMENT***



- ✓ Reduce energy consumption and costs
- ✓ Enhance energy efficiency and productivity
- ✓ Decrease greenhouse gas emissions and environmental impact
- ✓ Improve energy security and reliability
- ✓ Optimize energy resource allocation

# ***RENEWABLE ENERGY INTEGRATION***



- ✓ Denmark's wind power integration (43% of electricity)
- ✓ Germany's Energiewende (Energy Transition) program
- ✓ California's Renewable Portfolio Standard (RPS) goal (60% by 2030)
- ✓ China's solar and wind energy expansion
- ✓ Costa Rica's 100% renewable electricity goal

# ***CYBERSECURITY IN POWER SYSTEMS***



***Cybersecurity in Power Systems refers to the protection of :***

- ✓ Electrical grid and energy infrastructure from cyber threats.
- ✓ Ensuring reliable.
- ✓ Secure energy supply.

# ***ADVANCED TECHNOLOGIES FOR ENERGY EFFICIENCY***



- ✓ Advanced technologies for energy efficiency encompass innovative solutions to reduce energy consumption
- ✓ Enhance energy productivity.
- ✓ Promote sustainable energy use.
- ✓ Energy Storage Systems (ESS) like batteries and super capacitors.
- ✓ Advanced Building Management Systems (BMS)
- ✓ Smart Grids and microgrids.

# ***ELECTRIC VEHICLE CHARGING INFRASTRUCTURE***



***Electric Vehicle (EV) Charging Infrastructure refers to the network of:***

- ✓ Charging stations.
- ✓ Technologies.
- ✓ Services that support the charging of electric vehicles.
- ✓ Hardware and software for charging

# ***PLC PROGRAMMING AND OPTIMIZATION***



- 1. Code Optimization:*** Minimize scan time, reduce memory usage
- 2. Program Organization:*** Modular, structured programming
- 3. Data Management:*** Efficient data handling, minimize data transfer
- 4. Alarm and Event Management:*** Prioritize, filter, and log events
- 5. Network Optimization:*** Configure communication protocols, optimize bandwidth



# ***INDUSTRIAL COMMUNICATION PROTOCOLS***



- ✓ Field bus Protocols.
- ✓ Industrial Ethernet Protocols.
- ✓ Wireless Communication Protocols.
- ✓ SCADA/ICS Protocols.
- ✓ Easy Configuration and Maintenance.
- ✓ High-Speed Data Transfer.
- ✓ Low Latency and Jitter.

# ***CYBERSECURITY IN INDUSTRIAL AUTOMATION***



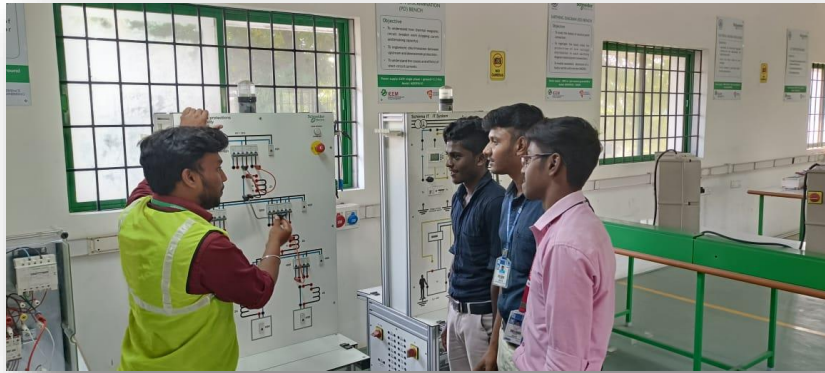
- ✓ Network segmentation and isolation.
- ✓ Firewalls and intrusion detection/prevention systems.
- ✓ Encryption and secure communication protocols.
- ✓ Access control and authentication.
- ✓ Regular software updates and patching.
- ✓ Continuous monitoring and incident response.
- ✓ Employee training and awareness program.

# ***INDUSTRIAL INTERNET OF THINGS (IIOT) INTEGRATION***



- ✓ Sensors and Actuators.
- ✓ Industrial Networking (Ethernet, Wi-Fi, Cellular).
- ✓ Cloud Computing (AWS, Azure, Google Cloud).
- ✓ Edge Computing.
- ✓ Artificial Intelligence (AI) and Machine Learning (ML).
- ✓ Data Analytics and Visualization.
- ✓ Cybersecurity Solutions.
- ✓ Industrial Automation Platforms (e.g., Siemens, Rockwell).

# ***REMOTE MONITORING AND CONTROL***



- ✓ SCADA (Supervisory Control and Data Acquisition) systems
- ✓ IoT (Internet of Things) devices
- ✓ Cloud Computing
- ✓ Mobile Apps
- ✓ Web-based Platforms
- ✓ Remote Desktop Protocols (RDP)
- ✓ Virtual Private Networks (VPN)
- ✓ Artificial Intelligence (AI) and Machine Learning (ML)

# ***ENERGY EFFICIENCY IN AUTOMATION***



- ✓ Variable Frequency Drives (VFDs).
- ✓ Energy-Efficient Motors.
- ✓ Power Factor Correction (PFC).
- ✓ Energy Harvesting.
- ✓ Smart Sensors.
- ✓ Energy Management Systems (EMS).
- ✓ Automated Lighting Systems.
- ✓ HVAC Optimization.

# ***REAL-TIME SIMULATION AND TESTING***



- ✓ Real-Time Simulation and Testing involves using advanced simulation tools and techniques to test and validate complex systems.
- ✓ Processes.
- ✓ Equipment in real-time.
- ✓ Reduced Testing Costs.
- ✓ Increased Testing Efficiency.
- ✓ Improved System Reliability.
- ✓ Enhanced Safety.
- ✓ Reduced Risk.
- ✓ Improved Product Quality.
- ✓ Faster Time-to-Market.
- ✓ Increased Collaboration.