Curriculum Map Template

Digital Instrumentation and Process Control	Outcome	ELE101 Device Data System Architectures	ELE110 Fundamentals of Electricity	ELE103 Analog and Digital Electronics	CSC102 Introduction to Information Technology	ELE113 Instrumentation and Process Control I	ELE158 Circuits, Schematics and Test Equipment	ELE205 Repair and Maintenance for Instrumentation	ELE210 Energy System Management	ELE213 Instrumentation and Process Control II	ELE235 Advanced Concepts and Applications of Instrumentation and Controls
Program Outcome #1	Understanding of the Fundamentals of Digital Instrumentation and Process Control.	Specify and build network components related to industrial data networks.	Identify hazards of electrical circuits and be able to work safely. Explain the concepts of current flow, AC/DC circuits and Ohms law.	Understand solid-state devices, such as semiconductors, diodes, transistors and amplifiers.	Have a sound introduction to Information Technology. Learn computer components and the roles computers play within an organization.	Identify the various types of instrumentation used in industry. Understand basic control techniques, specifically PID loop control. Understand control systems and terminology.	Recognize standard schematic symbols for common electrical and electronic components.	Apply correct practice to installation, calibration and maintenance of instruments Apply Intrinsic safety techniques to instrumentation installation.	Understand electrical energy measurement techniques, hardware and application	Understand a process control loop, its elements and various types of control variables. Explain Industrial Process Techniques and Instrumentation. Understand calibration and controller tuning.	Explain electronic signal conditioner circuits for sensor data acquisition. Distinguish between different DAQ techniques along with its corresponding software integration.
Program Outcome #2	Ability to conduct standard measurements, to analyze, to write, and to interpret lab reports.	Understand strengths and limitations of several industrial data protocols.	Recognize standard schematic symbols for common electrical and electronic components. Trouble-shoot basic electrical circuits using schematic diagrams.	Show a practical understanding of operational amplifiers applications. Calculate gain, input, and output impedances of linear amplifiers. Understand the theory and operation of digital devices.	Understand the theory and operation of Operating Systems and Applications. Understand Fundamentals of Networking.	Understand and apply the basic principles of signal conditioning.	Understand measurement errors and calibration procedures.	Predict and avoid the problems with installing measurement equipment Troubleshoot, isolate and fix electronic instrumentation problems Specify instrument and loop documentation requirements and standards.	Have a practical hands-on understanding of the installation, testing and trouble-shooting of electrical energy measurement systems.	Become familiar with advanced PLC programming and interfacing. Explain motion control and servomechanisms.	Understand typical design constraints of a Data Acquisition System (software and hardware). Integrate system monitors and control of complex processes using PLC sand PC-based SCADA software.

Program Outcome #3	To understand, and troubleshoot processes related to pressure, level, flow, temperature. To understand PID controllers, data collection and reporting, system maintenance, PLC (Programmable Logic Control), SCADA (Supervisory Control And Data Acquisition).	Troubleshoot simple networking protocol problems	Explain the operation and application of common components such as AC and DC motors, relays, switches, power supplies, overload devices and lighting.	Understand timing diagrams and state sequences of digital circuits.	Be able to describe computer networks and its components.	Understand design principles of control systems.	Recognize and competently use common test equipment to evaluate test circuits. Understand the complete cycle of printed circuit board fabrication.	Design and install safe working systems in hazardous areas Apply ISO 9000 to maintenance practices Carry out simple repair procedures for the correction of faults on instrument systems	Explain the operation of a complete energy management system Utilize the data from energy management systems to implement energy savings techniques for residences, commercial buildings, and industrial operations	Evaluate collected data from an instrumentation system. Identify security risk and determine standard precautionary measures. Select program and graphics required to implement a SCADA system.	Understand communication systems for Data Acquisition Systems (DAQ). Code Visual Interfaces for Data Collection, Data Logger, and Data Analysis. Design and build hardware and software interfaces of a Data Acquisition System. Understand PLC and SCADA systems.
Program Outcome #4	Work effectively in teams solving technical problems.	Projects and Research Activities designed to foster environments of scholar achievement.									
Program Outcome #5	Ability to communicate effectively both orally and in writing. Use of appropriate technical literature.	Read with proficiency reference material and be able to express conclusions in oral presentations and written formats.									