Course Information Booklet for Bachelor Course on Electrical and Energy Engineering
At Institute of Technology of Cambodia
Type of recognition planned: HEI Degree
Level of the course: Bachelor 4th Year of Engineering Degree
Contributors: Department of Electrical and Energy Engineering
Planned Teachers: Dr. KIM Bunthern
Title course: Industrial Network Protocol

Course Objectives

This course aims to provide both theorical and practical knowledge in communication protocols employed in industrial automation. This is to provide students the fundamentals and to enable them to solve the problem and to identify the structure and different network schemes as well as communication protocols. The practice works based on simulation and experiment are also provided to students toward narrowing the theory-practice gap of teaching.

Description of the Course (TOPICS/CHAPTERS), number of hours & type (Lecture or tutorial or laboratory works or Self-Learning)

Chapters	Topics	Number of hours	Type
1). Data communication and Networking	▪ Basic of digital communication ▪ Network and topologies ▪ The Internet ▪ Protocol for communication	4h	Lecture
2). Introduction to Computer Network	▪ Layered tasks ▪ The OSI model ▪ Layers in the OSI model ▪ TCP/IP protocol suite ▪ Addressing.	6h	Lecture and Tutorial
3). Industrial Network Protocols	▪ Introduction to PLC, DCS and SCADA system ▪ Fieldbus and topology ▪ HART, Modbus RTU, CANbus, Profibus ▪ Real time Ethernet. ▪ Modbus TCP, Profinet, EtherCAT	6h	Lecture and Tutorial

Prerequisite: Digital Electronics, Programmable Logic Controller and Signals and Systems

Learning Outcomes

Upon completion of this course, students should be able to:

- To know and identify the structure and type of network topologies.
- To identify the different varieties of network protocols employed in the industrial automation.
- To identify the advantage and inconvenient of common network protocols.
- To identify in an industrial system the different levels of a hierarchical automation and network.

- To know and choose for each level the most appropriate control and network communication strategies.

References:

[1] Michael J. Hamill, P.E « Industrial Communications and Control Protocols ». 2016 PDH Online.
[2] Chanchal Dey and Sunit Kumar Sen “Industrial Automation Technologies” 2020 Taylor & Francis Group, LLC.