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 5th Year of Engineering Degree
Contributors: Department of Electrical and Energy Engineering
Planned Teachers: Dr. KIM Bunthern
Title course: Industrial Automation

Course Objectives
The objective of this course is to provide advance knowledge in automation system employed in the industry. The aim is to introduce the students to the notion and concept of industrial control system, PLC programming and the Supervisory Control And Data Acquisition system (SCADA). The course also presents the more recent concept in the new era of industrial 4.0 such as Industrial Internet of Thing (IIoT) and Cybersecurity.

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) Introduction to Industrial automation	▪ Programmable Logic Controller (PLC) ▪ PLC components. ▪ PLC programming	6h	Lecture and tutorial
2) Industrial Network	▪ Network and topologies ▪ Industrial network ▪ Fieldbus protocols ▪ Industrial Ethernet	6h	Lecture and tutorial
3) SCADA system	▪ SCADA functionalities. ▪ Operator interface. ▪ Alarms and events management. ▪ Trends. ▪ Historian.	12h	Lecture and tutorial
4) Industrial Control Network and Cybersecurity	▪ SCADA system ▪ Open Platform Communications (OPC) ▪ Industrial Internet of things (IIoT) ▪ Cybersecurity terms and definitions ▪ Dependability, Vulnerability, Threat, Attack, Intrusion	8h	Lecture and tutorial

Prerequisite: Digital Electronics, Notion of programming language (C/C++ or Python), PLC Fundamentals, Network protocols.

Learning Outcomes

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

- explain the principle of industrial control system.
- design an industrial control system using PLCs and its components.
- design a SCADA system based on HMI software and PLC programming software.
- explain and analyse network security of an industrial control network.

References:

[1] Chanchal Dey and Sunit Kumar Sen "Industrial Automation Technologies" 2020 Taylor & Francis Group, LLC.
[2] Karl-Heinz John · Michael Tiegelkamp "IEC 61131-3: Programming Industrial Automation Systems" Springer-Verlag Berlin Heidelberg 2001, 2010.