

***Department of Industrial Engineering
and Decisions Analytics***

**IEDA 2100S: COMPUTING IN INDUSTRIAL APPLICATIONS
(Spring Semester 2025 Course Vector: 2-0-3:3)
Syllabus is evolving (last updated on 21 Jan 2025)**

Prof. Richard H.Y. So
Rm5597, Tel: 2358 7105,
E-mail: rhyso@ust.hk

Aims:

To equip IEDA students with the knowledge of micro-processor controls and automations so that you are confident to work in high value added industries such as IoT systems, medical devices, and high end consumer products.

Learning Philosophy:

Successful IEDA graduates are creative in using advanced technology. Creativity is about making new and original associations among different technologies. This course will provide hands-on experience on automation technology.

Course Learning outcomes: after this course, students should be able to:

Knowledge/Content Related:

- (i) acquire and practice the ability to design, construct, analyze and critique a simple control system with sensor and actuators;
- (ii) acquire and practice the ability to identify, compare and contrast the basic architecture of different computers;

Academic Skills/Competencies:

- (iii) acquire and practice the ability to program a Programmable Logic Controller to perform some automated tasks;
- (iv) practice the ability to solve automation technology problems through self-learning

Lectures: Thu 12:00 – 13:50, Rm2463

Labs: Mon, 10:30 - 13:20 ; 17:00 – 19:50 (Rm 4223)

Office hours: appointments via e-mails (rhyso@ust.hk)

Reference Text:

This is a lab-based course and full lecture notes and laboratory instructions have been written and will be put on the course Web site.

Supplementary Reading:

Jacob, J.M. (1988) Industrial control electronics: application and design. Prentice Hall. ISBN 0-13-459306-5. (TK7881.2 J33 1988).

Phipps, C.A. (1995) Fundamentals of Electrical Control. The Fairmont Press Inc. ISBN 0-13-504846-X. (TK 7881.2 P55 1995).

Smith, E. and Vivian, B.E. (1995) An introductory guide to valve selection. Mechanical Engineering Publications Limited, London. ISBN 0-85298-914-8. (TJ 223 V3 S65 1995).

Course Grading:

Mid-Term Exam	20%	(Open-book exam.)
Final Exam	35%	(Open-book exam.)
Lab. work	40%	(NO copying *)
Class & Lab Participation	5%	

100%

Course Syllabus (Draft)

* Heavy penalty for copying!!

	Lecture	Lab session
Wk1	Thu (6/2) Topic 1: Introduction to Automation - automation in HK - components & structures of automated systems - course overview	Mon (3/2) – no lab
Wk2	Thu (13/2) Topic 2: Pneumatic Control - usage in HK - basic components - symbols & circuit diagram	Mon (10/2) – No Lab
Wk3	Thu (20/2) Topic 3: Sensors, transducers, & transceivers - definitions & usage in HK - types & characteristics - working principles	Mon (17/2) – Lab #1 (Rm4223): To be arranged
Wk4	Thu (27/2) ... continue Topic 3	Mon (24/2) – Lab #2 (Rm4223): To be arranged
Wk5	Thu (6/3) Topic 4: Ladder Logic & PLC - basic PLC hardware - ladder logic diagram for circuit design - ladder logic as a programming tool - case studies & exercises	Mon (3/3) - Lab #3 (Rm4223): To be arranged
Wk6	Thu (13/3) ... continue Topic 4	Mon (10/3) – Lab #4 (Rm4223): To be arranged
Sat	Sat (15/3 or 22/3) possible site visit	
Wk7	Thu (20/3) ...Continue Topic 4	Mon (17/3) - Lab #5 (Rm4223): To be arranged

	Lecture	Lab session
Wk8	Thu (27/3) – evening **<<Mid-term Examination>>**	Mon (24/3) - Lab #6 (Rm4223): To be arranged
Wk9a	Thu (3/4) - No lecture (mid-term break)	Mon (31/3) – no lab Mid-term break
Wk9b	Tue (10/4) - Topic 5: Analogue, Digital & Micro-processor Controls - basics of digital signals - architecture of a PC - standard I/O interfaces of a PC	Mon (7/4) - Lab #7 (Rm4223): To be arranged
Wk10	Thu (17/4) – Continue Topic 5	Mon (14/4) - Lab #8 (Rm4223): To be arranged
Wk11	Thu (24/4) - Topic 6: Electro-magnetic Actuation - usage in HK - types of motors & relays - stepping motors & servo motors	Mon (21/4) – no lab Easter Monday
Wk12	Thu (1/5) - No lecture (Labor Day)	Mon (28/4) - Lab #9 (Rm4223): To be arranged
Wk13	Thu (8/5) - Continue Topic 6	Mon (5/5) – no lab Birthday of Buddha
	Study break followed by Final Examination	

NB: Lecture notes and lab instructions can be downloaded from CANVAS