Department of Industrial Engineering
and Decision Analytics

IEDA 2100E: COMPUTING IN INDUSTRIAL APPLICATIONS
Experiential Version
(Spring Semester 2023 Course Vector: 0-0-6:3)

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[Syllabus is evolving: update are highlghted in YELLOW]

Aims:
To equip UG students with the knowledge of micro-processor controls and automations so that you are confident to apply automation technology to the industry in this IoT age.

Learning Philosophy:
Successful UG graduates are creative in using advanced technology. Creativity is about making new and original associations among different technologies. This Experiential course will provide hands on experience on automation technology through a collaborative project-centered approach.

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 (or a processor) to perform some automated tasks;
(iv) practice the ability to solve automation technology problems through self-learning

Lab work - expected 6-8 hrs per week
[Workload will be HEAVIER than a normal 3-credit UG course !]
Team A - TBA
Team B - TBA
Team C - TBA
Office hours: appointments via e-mails (rhyso@ust.hk) or Whatapps

Reference Text:
The full lecture notes and laboratory instructions of IELM2100S have been provided as reference materials.

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:

Project Reports[2] (27%)
- 1st draft of team proposal 4%
- Revised team proposal 8%
- Technical Specifications 10%
- User manual 5%

Prototypes[2] (30%)
- Project realization
  (midterm review) 10%
  (final competition) 20%

Learning Portfolios[1] (28%)
- Individual learning plan 8%
- Individual learning portfolio 20%

Course Participation[1] 9%
Peer Evaluation[1] 6%
Total: 100%

[1] individual marks (43%)
[2] team marks (57%)

Course Timelines (Evolving …)

31 Jan	CANVAS published
1 Feb	Introduction session with Industry Guest Speaker: Jacky from Kerry
2 Feb	Posting of past example of initial and final proposals, technical specs and user manual on CANVAS
5 Feb	Call for tender proposal released (1st draft proposal due on 18 Feb).
8 Feb	Setup of class whatapps group for rapid communications
Chinese New Year Break	
16 Feb	End of add / drop period
16 Feb	Team formation
18 Feb	Each team agreed to 1-hr COMMON weekly working slot
19 Feb	Team whatapps group formed
19 Feb	Tour of IA Lab (4223) and 24/7 access to the lab
23 Feb	Draft team proposal due
24-28 Feb	Feedback meeting for submitted draft proposal with comments using rubrics
1 Mar	Submission of refined team proposals (same rubrics)
2 Mar	Budget approval and place order on components
28Feb – 3Mar	First peer evaluation
4Mar	Posting of past example of individual learning portfolio (ILP) and Guide to ILP
10 Mar	Draft Individual PLAN due 10 Mar
22 Mar	**Midterm Review (Fri 10am – 12pm) at Kerry Logistics Depot**
28 Mar	Last day of submission of individual learning portfolio PLAN

<28 Mar to 5 April midterm break >

8-12 Apr	Individual meetings to go through individual learning PLAN and 2nd collection of peer evaluation
18 Apr	Draft ILP (not plan but ILP portfolio draft)
13 May (Mon)	Final Competition (TBC)
17 May	Submission of Tech Specs & User Manual
17-22 May	Final collection of peer evaluation
30 May	Last day of submission of individual learning portfolio

Rubrics for marking the draft proposal 2024

	Schedule (10%)	Technology/Design (50%)	Team organization (10%)	Industry Comments (30%)
Excellent	Realistic, well planned with measurable milestones	Innovative & creative; unique features; can address & solve the problem(s); simple & implementable	Fully utilized the talent; balanced work load; clear and measurable deliverables from each person	Kerry Logistics will be asked to rank the proposal and give detailed comments.
Good	Over/under estimation of progress, well planned with measurable milestones	Can address * solve the problem(s); simple & implementable	Balanced workload; Clear & measurable deliverables from each person	
Average	Over/under estimation of progress, reasonable plan with measurable milestones	Can address & solve the problem(s); implementable but can be complicated	Clear & measurable deliverables from each person	
Below average	Unrealistic, plan is not well thought through, not enough measurable milestones	Can address the problem(s); not sure it is implementable	Deliverables from each person is not clearly measurable	

IEDA 2100 E
Spring 2024

Individual Learning Portfolio (ILP) Guideline

Ir. Prof. Richard So, IEDA
Phoebe Mok, CEI

What is an Individual Learning Portfolio (ILP)?

'A portfolio is a purposeful collection of student work that exhibits to the student (and/or others) the student's efforts, progress, or achievement in given areas. This collection must include: student participation in selection of portfolio content; the criteria for selection; the criteria for judging merit; and evidence of student self-reflection'

Northwest Evaluation Association, Portfolios, Portfolio News, 2(3), 1991, p. 4.

The Portfolio is a …
Mirror -- Captures the reflective nature of the portfolio. Allows students to "see" themselves over time
Map -- Creating a plan and setting goals
Sonnet -- Provides a framework, but the contents can showcase creativity and diversity

Dr. Mary Diez' Metaphors

How can this ILP benefit your learning?

As an engineering student, developing a systematic approach to gather data, and applying critical and creative thinking skills to solve problems are crucial to both your academic success and your future career development.

The ILP intends to help you strengthen the abilities and develop the essential skills as engineers. By documenting and reflecting on your learning experience, ILP allows you to synthesize learning, acquire knowledge, build learning connections, and demonstrate the evidence of professional skills and abilities.

Important information before you start

IELM 2100E Course Intended Learning Outcomes (CILO)

CILO describes what you should be able to do or demonstrate (in terms of knowledge, skills and attitudes) by the end of the course. As you draft/ revise your ILP, you should refer to the CILO from time to time to demonstrate how your learning is related to what the course intends you to learn.

After this course, students should be able to:

Knowledge/Content Related:

(v) acquire and practice the ability to design, construct, analyze and critique a simple control system with sensor and actuators;

(vi) acquire and practice the ability to identify, compare and contrast the basic architecture of different computers;

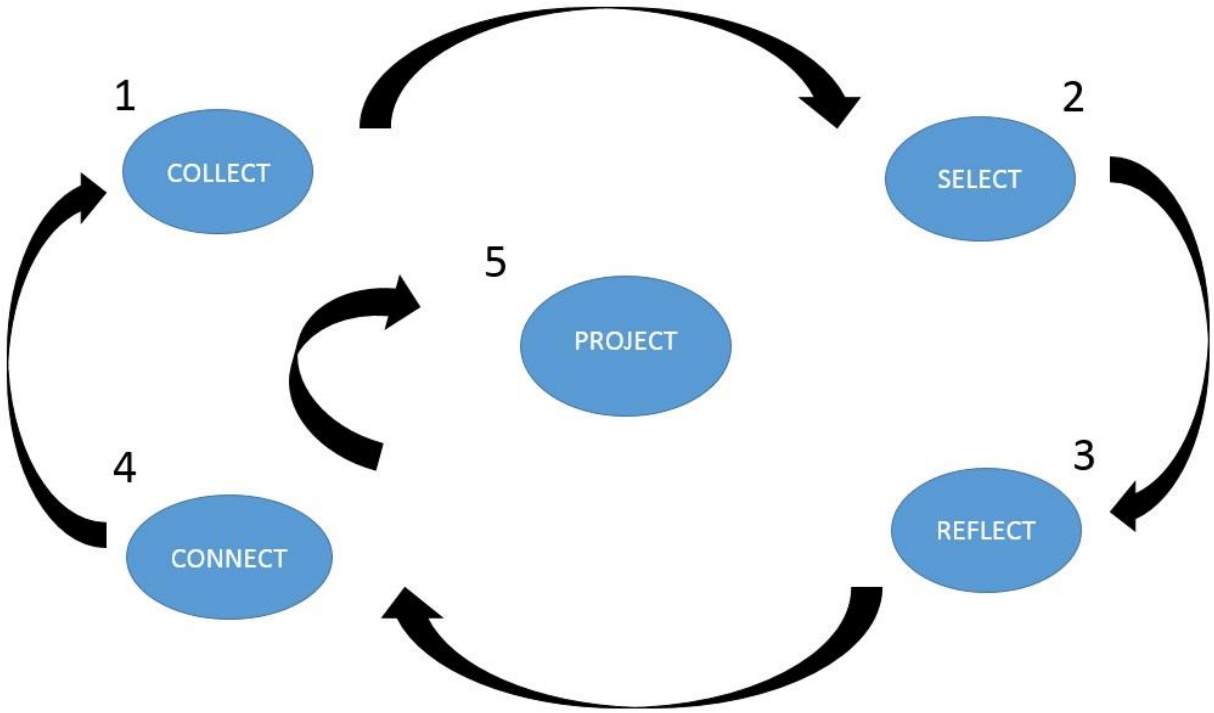
Academic Skills/Competencies:

(vii) acquire and practice the ability to program a Programmable Logic Controller (or its equivalent) to perform some automated tasks;

(viii) practice the ability to solve automation technology problems through self-learning

Format/ Flow of ILP:

The ILP helps you summarize your experiential learning activities by collecting, selecting, reflecting, and connecting and projecting your evidence of learning.



Barrett, H. (2011)

1. Collect -- Collection is abundance

All the artifacts that you collect should have a purpose demonstrating a skill/ competency/ knowledge acquired in a learning experience. Although you should collect a wide range of artifacts that you have many options from which to choose, don't save everything! The purpose of collecting your artifacts should be clear to you and the audience. Make sure you date and label the artifacts using a template, table or spreadsheet for tracking, reference, and retrieval. If the artifacts were copied / modified from another source, please make sure you have added proper citations and credits.

Examples of artifacts include but not limited to:

- Notes / handouts
- Design log book/ lab report/ journal/ blog entries
- Background research on the target served group

- Fieldtrip for site visit
- Research projects and research-related writing
- Search reports for components, open-source codes, … etc
- Photographs, images, artwork
- Group projects (circuit diagrams, coding …)

2. Select – Selection is abandonment

Selecting the key and appropriate items that illustrate competencies and skills will clearly demonstrate your abilities and achievements to the audience. Consider the following questions when selecting artifacts:

- Why did you select this particular artifact?
- What did you learn from this artifact?
- How does the artifact reflect your strengths, interests?

3. Reflect – Reflection is a mirror into the self

"Reflection is the process of stepping back from an experience to ponder, carefully and persistently, its meaning to the self ..." (Daudelin 1996)

This is the heart of the portfolio. This is where you think about why you have chosen each particular piece for your portfolio; how it shows proof of growth and learning based on your initial learning goals; what you want your audience to know about it, and what you have learned from it.

In experiential learning, reflection is not recalling, it transforms experiences, connects learning to the experience and help you to make meaning of the experience. Through reflection, you can analyze critically about your responses/performance/action in the experiential activities, with references to the course content and the learning outcomes.

Some guiding questions may help you structure your reflection:

- Describe your learning process. What did you learn? How did you learn?
- What went well? Why? How could you build upon it in the future?
- What difficulties did you face? Why? How could you improve in the future?
- Would you have done anything differently?

4. Connect – Connecting is conversing

Make meaningful connections (e.g., personal, learning, future career etc.) between the artifacts you selected and the CILO. By understanding how your learning experience is connected with a specific CILO, it will help you see a bigger picture of your learning progress and set goals more realistically.

5. Project – Project is focusing

Look ahead and set goals for the future. Observing or looking for patterns in your work can help identify goals for future learning.

- What is the purpose of your portfolio?
- How can you apply what you learnt from this experience in the future?