

	<p>HO CHI MINH UNIVERSITY OF TECHNOLOGY AND EDUCATION</p> <p>FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING</p>	<p><b>Programme:</b> Biomedical Engineering</p> <p><b>Programme Level:</b> Undergraduate</p>
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## Syllabus

1. **Course Name:** Data Acquisition and Control Using Computer
2. **Course Code:** APME332365
3. **Credits:** 3 credits (3:0:6) (3-hour lecture and 6 hours of self-study per week)
4. **Course Instructor(s):**
  - A. Assoc. Prof. Thanh-Hai Nguyen
  - B. Assoc. Prof. Van-Thuyen Ngo
5. **Registration Requirements**
  - A. Pre-requisite Course(s): None
  - B. Previous Course(s): None

**6. Course Descriptions:**

This course teaches students about the types, structure, and applications of data acquisition and control systems. It introduces learners to the practical principles of signal and data processing blocks and programming techniques to collect data in reality. Moreover, students will learn about Open Platform Communications (OPC) and Supervisory Control and Data Acquisition (SCADA) systems, including their components and functions within the system.

**7. Course Learning Outcomes (CLOs)**

CLOs	Descriptions	ELO(s)/PI(s)	Competency
CLO1	Explain the structure of OPC and methods of determining proper OPC standards and specifications for a control system.	ELO1/PI1.1	I
	Demonstrate understandings about the structure of SCADA systems alongside the requirements for the systems.	ELO1/PI1.1	
CLO2	Select, utilize and operate suitable SCADA software for the systems depending on the case.	ELO2/PI2.1	R
	Program a system to collect, process, and display technical data.	ELO2/PI2.2	
CLO3	Analyze the structures and functions of individual components of DAQ and control systems.	ELO7/PI7.3	R
CLO4	Design and program to control SCADA and COM/DCOM systems.	ELO9/PI9.3	R

*Notes: I: Introduction, R: Reinforce, M: Mastery*

## 8. Course Content

- Overview of data acquisition and control systems: Introduction to DAQ and control systems; Structures and functions of components within DAQ and control systems; Classification, selection, and evaluation of individual components within the DAQ and control systems.
- Data processing: Sensors and processing blocks of sensors; ADC and DAC converter and PC; Component analysis of existing signal processing systems; Data acquisition, processing, and control software.
- SCADA software: Introduction to SCADA softwares about their applications; Data exchange between SCADA software and processing blocks through OPC.
- SCADA system designs: Standards and procedures of SCADA system designs; Designing SCADA systems using WinCC, Factory Talk, Intouch, and LabVIEW programmable development platform.

## 9. Teaching Methods

- Presentation
- Group discussion
- Problem solving
- Scenario-based learning

## 10. Student Assessments

- Grading scale: **10**
- Assessment plan:

No.	Content	CLOs	Competency	Assessment Methods	Assessment Tools	Weighting (%)
<b>Formative Assessment</b>						<b>50</b>
1	Explain the structures of OPC and methods of choosing the right OPC for different systems.	CLO1	I	Short-answer questions	Questions	10
2	Explain the structure of SCADA systems alongside the requirements of systems	CLO1	I	Short-answer questions	Questions	10
3	SCADA system design using WinCC, Rsvision, Factory Talk, InTouch, and/or LabVIEW	CLO2	R	Essay	Questions	15
4	- Analysis of the structures and functions of components of DAQ and control systems.	CLO3	R	Essay	Questions	15
<b>Summative Assessment</b>						<b>50</b>

5	- Programming DAQ systems and presenting data - Designing and developing SCADA and COM/DCOM control systems.	CLO2 CLO4	R	Essay	Grading rubric	50
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## 11. Learning Materials

### A. Main reading:

- McCrady, Stuart G. Designing SCADA Application Software: A Practical Approach. Elsevier Science, 2013.

### B. Extra reading:

- Rubin, William, and Marshall Brain. Understanding DCOM. Prentice Hall, 1999

## 12. General Information

### Academic Integrity

All students in this class are subject to HCMUTE's Academic Integrity Policy (<http://sao.hcmute.edu.vn/>) and should acquaint themselves with its content and requirements, including a strict prohibition against plagiarism. Any violations will be reported to the Faculty of Electrical and Electronic Engineering Dean's office.

### Notice of Change

All information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advanced notice. Students need to regularly update the information of their registered class.

### Intellectual Property

All contents of these lectures, including written materials distributed to the class, are under copyright protection from HCMUTE's Intellectual Property Regulations. Notes based on these materials may not be sold or commercialized without the express permission of the instructor.

## 13. Approval Date:

## 14. Endorsement:

Dean of Faculty	Head of Department	Course Instructor
Assoc. Prof. Minh-Tam Nguyen	Assoc. Prof. Thanh-Hai Nguyen	

## 15. Revision History:

<p>1<sup>st</sup> Revision:</p>	<p><i>Course Instructor</i></p> <p><b>Assoc. Prof. Thanh-Hai Nguyen</b> <i>Head of Department</i></p>
<p>2<sup>nd</sup> Revision:</p>	<p><i>Course Instructor</i></p> <p><b>Assoc. Prof. Thanh-Hai Nguyen</b> <i>Head of Department</i></p>