

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

1. **Course Name:** Digital Systems
2. **Course Code:** DIGI1330163
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. Duc-Dung Vo, MEng
 - C. Truong-Duy Nguyen, MEng
 - D. Duy-Thao Nguyen, MEng
5. **Registration Requirements**
 - A. Pre-requisite Course(s): Basic Electronics
 - B. Previous Course(s): Basic Electronics; Circuit Theory

6. Course Descriptions:

This course provides students with the knowledge of digital systems, the fundamental theories of Boolean algebra, the structures and operations of essential elements in digital circuits, the structure of digital ICs, computational methods, and the design of sequential and combinational logic circuits. In addition, the course also provides students with operating principles and methods of calculating and designing digital oscillator and timing circuits, memory structure and the principle of analog-to-digital converters, methods of using memory, and analog-to-digital converters in the digital system.

7. Course Learning Outcomes (CLOs)

CLOs	Descriptions	ELO(s)/PI(s)	Competency
CLO1	Explain the principles of combinational circuits, sequential circuits, oscillators and timing circuits, memory structures, and analog-to-digital conversion methods.	ELO1/PI1.1	R
	Apply Boolean algebra theorems, logic expressions of digital circuits, basic elements, and distinguish types of digital circuits.	ELO1/PI1.2	
CLO2	Read and understand technical documents related to digital ICs.	ELO6/PI6.4	R
CLO3	Design combinational logic circuits, sequential logic circuits; computation in oscillating and timing	ELO1/PI1.3	R

	circuits; Calculating memory systems and designing analog-to-digital conversion applications.		
CLO4	Present technical reports on digital systems.	ELO2/PI2.3	R
CLO5	Simulate, analyze results, verify digital circuit operation.	ELO7/PI7.2	R

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

8. Course Content

- Digital systems and types of codes.
- Boolean Algebra and Basic Logic Gates.
- Combination logic circuit design method and application design.
- MSI combinational circuit types (multiplexer, demultiplexer, encoder, decoder, binary adder and subtractor, binary comparator, Parity generator and checker).
- Sequential circuit concept and Flip-Flop types (RS, JK, D).
- Flip-Flop application to design asynchronous counters, synchronous counters, ring counters, and shift registers.
- Specifications of digital IC families and interfaces.
- Oscillators and timing circuits using logic gates and IC NE555.
- Structure and operation of semiconductor memory types.
- Basic concepts and types of analog-to-digital converter circuits.

9. Teaching Methods

- Presentation
- Solving exercises
- Group report

10. Student Assessments

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

No.	Content	CLOs	Competency	Assessment Methods	Assessment Tools	Weighting (%)
Formative Assessment						50
1	Theorems, concepts, basic principles of digital circuits. Actively participate in lessons	CLO1/ PI1.1	R	Quizes Mini tests	Score sheet (online)	10
2	Differentiate circuit types, design methods of basic sequential and combinational logic circuits	CLO2/ PI1.2	R	Essay test	Short questions	30

3	Design and simulate application circuits.	CLO4/ PI2.3 CLO5/ PI7.2	R	Small project Presentation	Rubric	10
Summative Assessment						50
4	Questions explaining, calculating, designing digital circuits.	CLO2/ PI6.4 CLO3/ PI1.3	R	Essay test	Short questions	50

11. Learning Materials

- Textbook(s):
- [1] Nguyen Truong Duy, Vo Duc Dung, Nguyen Thanh Hai, Nguyen Duy Thao, Giao trinh Ky thuat so, Published by VNU-HCMC, 2019.
- References:
- [2] Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital Systems: Principles and Applications, 12th Ed. Peason, 2017.

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