113-2 Full Curriculum of Da-Yeh University

Information			
Title	The Design of Digital Systems	Serial No./ID	0483 /IFI3004
Required/Credit	Required /3	Time/Place	(Mon)234 /H708
Language	Chinese	Grade Type	Number
Lecturer /Full- or Part-time	Tsai Huan-Liang /Full-time	Graduate Class	Non-graduating Class
School System /Dept /Class, Grade	Bachelor /Department of Computer Science and Information Engineering /Class 1, Grade 2		
Office Hour / Place	(Mon) 16:20~17:10, (Tue) 16:20~17:10, (Wed) 16:20~17:10, (Thu) 08:10~09:00 / H715		
Lecturer	n.a.		

Introduction

This course introduces the basic principles of digital circuit design and technology, is one of the basic core curriculum areas of Information Engineering. The course covers sequential circuit elements, the basic sequential circuits (such as a counter, etc.), the timing analysis of sequential circuits, the finite state machine and the design of sequential circuit. Students can build up correct concepts on sequential circuit design by the instruction and exercises practice.

Outline

Unit 1 Latches , and Flip-Flops
Unit 2 Registers , Shift Registers , Binary Counters , and Counters for other Sequences
Unit 3 Analysis of Clocked Sequential Circuits, and State Tables and Graphs
Unit 4 Derivation of State Graphs and Tables
Unit 5 Reduction of State Tables
Unit 6 Design of Sequential Circuits

Prerequisite

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The Relationship Between Courses and Departmental Core Competencies and Basic Skills

- 1.2 Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- 2.1 Ability to design and conduct experiments, as well as to analyze and interpret data
- 2.2 Ability to propose, conduct, and write the reports of a research project
- 2.3 Ability to dedign and integrate the systems
- 3.1 Ability to cooperate supportively with others and communicate effectively
- 3.3 Ability to engage in life-long learning

1.1 Knowledge of mathematics and physics for the application of information engineering

3.2 Understanding of engineering ethics and international vision

Teaching Plan						
Core Capability	Weight(%)【A】	Ability index(Performance Indicators)	Teaching Methods	Assessment and Weight	Core Competency Learning Outcomes【B】	Final Exam Grades【C=B*A】
1.2 Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	30	The practical abilities	Group Work Practical Operation (Experiment, Machine Operation Lecturing Student Presentation Special Report	Oral Report: 20% Course Participation: 20% Final Exam: 40% Written Report: 20%	Total: 100	30
2.1 Ability to design and conduct experiments, as well as to analyze and interpret data	10	The professional abilities	Student Presentation Practical Operation (Experiment, Machine Operation Lecturing Special Report	Oral Report: 20% Course Participation: 20% Final Exam: 40% Written Report: 20%	Total: 100	10
2.3 Ability to dedign and integrate the systems	20	The professional abilities	Lecturing Practical Operation (Experiment, Machine Operation Student Presentation Special Report	Final Exam: 40% Course Participation: 20% Oral Report: 20% Written Report: 20%	Total: 100	20
1.1 Knowledge of mathematics and physics for the application of information engineering	40	The professional abilities	Lecturing Practical Operation (Experiment, Machine Operation Student Presentation Special Report	Final Exam: 40% Course Participation: 20% Oral Report: 20% Written Report: 20%	Total: 100	40

Grade Auditing

Final Exam: 40%
Written Report: 20%
Course Participation: 20%
Oral Report: 20%

Book Type (Respect intellectual property rights. Please use official textbooks and do not illegally photocopy others' works.)

Book Type	Book name	Author
Textbook	The Designer ’ s Guide to VHDL	Peter J. Asbenden
Textbook	數位邏輯設計與晶片實務Verilog	劉紹漢

Lesson Plan

Weeks	Content	Teaching Methods
1	Syllbus and teams & Intellectual Property Protection (use legitimate textbooks only) & Traffic safety Propaganda & Gender equality education promotion	Lecturing
2	Basic gates: NOT, AND, OR, NAND, NOR	Lecturing、 Practical Operation (Experiment, Machine Operation
3	Digital gates: NAND, NOR, Ex-OR, EX-NOR	Lecturing、 Practical Operation (Experiment, Machine Operation
4	Combinational logic systems: half adder, Full adder	Lecturing、 Practical Operation (Experiment, Machine Operation
5	Combinational logic systems: BCD adder, Look-ahead adder	Lecturing、 Practical Operation (Experiment, Machine Operation
6	Combinational logic systems: half substractor, Full substractor	Lecturing、 Practical Operation (Experiment, Machine Operation
7	Combinational logic systems: BCD substractor, 2'complement substractor	Lecturing、 Practical Operation (Experiment, Machine Operation
8	FPGA/CPLD systems	Lecturing、 Practical Operation (Experiment, Machine Operation
9	Mid exam: DE-10 Lite FPGA system	Lecturing、 Practical Operation (Experiment, Machine Operation

10	Practice of Combination logic system: half adderm Full adder, BCD adder and Look-ahead adder	Lecturing、 Practical Operation (Experiment, Machine Operation
11	Practice of Combination logic system: half substractor, Full substractor, BCD substractor and 2's substractor.	Lecturing、 Practical Operation (Experiment, Machine Operation
12	Practice of Combination logic system: Compartors	Lecturing、 Practical Operation (Experiment, Machine Operation
13	Practice of Combination logic systems: Encoder and decorder	Lecturing、 Practical Operation (Experiment, Machine Operation
14	Practice of Combination logic systems: multiplexer and de-multiplexer	Lecturing、 Practical Operation (Experiment, Machine Operation
15	Practice of Sequential logic systems:Flip-flop and Counter	Lecturing、 Practical Operation (Experiment, Machine Operation
16	Practice of Sequential logic systems:Pulse generator and shift registor	Lecturing、 Practical Operation (Experiment, Machine Operation
17	Self-directed Learning & Flexible Teaching/Learning	Flexible Teaching - Independent Action
18	Self-directed Learning & Flexible Teaching/Learning	Flexible Teaching - Independent Action