

West Virginia University
College of Engineering and Mineral Resources
Lane Department of Computer Science and Electrical Engineering

CpE 271: Introduction to Logic Design

Semester:	Fall-2019
Course Format And Credit Hours:	3 hr Lecture, 3 hr Credit
Pre-requisites:	MATH 156
Meeting Time and Location:	ESB-E G39 - Tuesday, Thursday 12:30 - 1:45 pm
Instructor:	Powsiri Klink _{hachorn} Office: 259 Advanced Engineering Research Building Tel: (304) 293-9696 Email: poklinkhachorn@mail.wvu.edu
Office Hours:	8 am -9:15 am and 11am -12:15 pm, TTH Or by appointment (please call or e-mail to make sure that I will be in my office.)
WebPage:	Ecampus.wvu.edu
Recommend Text:	<i>Fundamentals of Logic Design, 5th Edition (ISBN 0-534-37804-8)</i> <i>or 6th Edition (ISBN-13: 978-0-495-47169-1),</i> <i>By Charles H. Roth, Jr., Thomson Brooks/Cole or Cengage Learning</i>
Course Objectives:	An introduction to the design of digital systems and computers. Topics include number systems, coding, Boolean switching algebra, logic design, minimization of logic, sequential networks and design of digital subsystems.
Expected Outcomes:	At the end of this course, a student should be able to: <ol style="list-style-type: none">1) Perform base conversions and binary arithmetic.2) Generate, minimize and implement logic expressions from problem statements3) Minimize logic expressions using Boolean algebra/ K-Map4) Design, analyze and implement Combinational Logic circuits5) Design, analyze and implement Synchronous Sequential circuits.

Grading:

Best of the following 2 options

Option 1	Without Comprehensive Final Exam	
	Attendance, Quizzes, and Homework	10%
	Hour Exams (3)	90%
Option 2	With Comprehensive Final Exam	
	Attendance, Quizzes, and Homework	10%
	Best 2 out of 3 Hour Exams	50%
	Final Exam (Comprehensive)	40%

A - 90 - 100

B - 80 - 89

D - 60-69

C - 70 - 79

F - 59 and below

**Attendance/Quiz (5%),
Homework (5%):**

It will be very difficult to pass this course without attending class. ***There will be a quiz at the end of almost every class.***

Homework will be assigned and given every week. You are required to do all homework. All homework will be due at the beginning of class on the instructor's desk. Late homework will not be accepted.

Hour Exams:

3 Hour Exams will be given through the semester. The 2 highest score from the exams will be counted in Option 2. ***There will be no makeup exam.*** If you miss an exam your grade will be calculated solely on Option 2.

Calculators, cell phones, and/or smart watches are not permitted during the exams. At the beginning of the exam, you must place your personal belongings including cell phone (in silent mode) and etc. at the front of the classroom

Final Exam:

The Final Exam is optional (see Option 2) and will be Comprehensive, i.e. cover everything we have done during the semester.

Plagiarism:

You are encouraged to consult the instructors or TAs if you have any questions on homework or exams. The homework and exams are expected to be individual work. Handing in work that was jointly prepared and/or copied will be considered plagiarism and will be handled according to the WVU academic dishonest policy.

Class distractions:

Cell phones, pagers, etc. must be turned OFF during class. There are distracting for all.

Course Outline: This course is a typical lecture/demonstration, problems course. The textbook will be used as a guide.

Introduction

Number Systems and Conversion Chapter 1
Binary Arithmetic
Representation of Negative Numbers

Boolean Algebra

Boolean Expressions and Truth Tables Chapter 2, 3
Basic Theorems and Laws of Boolean Algebra
Algebraic Simplification of Switching Expressions

Applications of Boolean Algebra

Conversion of English Sentences to Boolean Equations Chapter 4
Combinational Logic Design Using a Truth Table
Minterm and Maxterm
Incompletely Specified Functions

NAND and NOR Gates

Design of Two-level Circuits Using NAND and NOR Chapter 7
Design of Multi-level NAND and NOR

Simplification of Switching Functions

Simplification using Karnaugh maps Chapter 5, 6

EXAM #1

Simplification of Switching Functions (continued)

Simplification using Karnaugh maps Chapter 5, 6
Tabular Minimization Method

Combinational Circuit Design

Gate Delays and Timing Diagrams Chapter 8
Hazards in Combinational Logic

Multiplexers, Decoders, and Programmable Logic Devices

Decoders, Multiplexer, Adders Chapter 9
Gate Arrays -PLA/PAL, PROM, PLD, FPGA

EXAM #2

Analysis of Sequential Systems

Synchronous versus Asynchronous Chapter 11, 12, 13
Memory Devices, Shift register, Counters, etc.
State tables and Diagram

Design of Sequential Systems

Analysis and Synthesis of Synchronous Sequential Circuits Chapter 16

EXAM #3

Academic dishonesty

- I consider it academic dishonesty if you share assignments/exams solutions with other students.
- If a student does discuss and share work with another, thinking that the person who is receiving that information will not copy it, **both people** will be held responsible for academic dishonesty if identical work is submitted and both claim that it is original.
- Grades assigned during the semester on exams, quizzes, reports, or homework assignments are considered final and are not subject to negotiation for any reason other than an indisputable mistake in grading.
- Use of cell phones, smart wearable devices, or possession of other external communication devices are strictly prohibited during exams, tests, or quizzes administered inside the classroom.
- Common standards of academic integrity prohibit not only cheating or plagiarizing, but also the unethical conduct of trying to obtain grades that the student has not earned. Violations of academic integrity are described in the WVU Catalog: <http://bit.ly/2hDAeUa>.
- Students have the right to appeal final grades that do not involve charges of academic dishonesty. Students may appeal charges of academic dishonesty. The appeal process is outlined in the WVU Catalog: <http://bit.ly/2uiMM9E>.
- Incidents of student misconduct or academic dishonesty will be handled promptly and appropriately in accordance with the WVU Student Conduct Code and Discipline Procedure. The case will be referred to the Office of Student Conduct. Violations may lead to dismissal from the Statler College and expulsion from the University.

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu>.