Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: ELEC 121 **Year: 2020-2021**

Course Title: Digital Electronics I **Credit Hours: 3**

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, reasonable accommodation to students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

Course Description

An introduction to digital electronics. Basic digital concepts such as binary arithmetic and Boolean algebra are introduced and combinational logic circuits are analyzed and discussed. Combinational logic is then used to analyze MSI ICs like arithmetic, parity, and code conversion circuits. Prerequisites: Prior completion or concurrent enrollment in ENGL 099, MATH 100, and RDNG 116 if required by placement testing. 3 Cr. (3 Lec.).

Course Context/Audience

This is the first course in the digital sequence of the Electrical Engineering Technology program. It is required in the A.A.S. and the certificate programs and is a prerequisite course for ELEC 222 (Digital Electronics II).

Basic Skills/Entry Level Expectations

Writing: W1 Student should be taking ENGL 099 (if needed). The course requires very limited writing, e.g., short written responses of a paragraph or less.

Math: MC College level math skills – Course requires college level math skills. See course description for co-requisite and/or prerequisite requirement(s).

Reading: R3 The student should be taking RDNG 116 (if needed). The course requires reading of mostly beginning college-level materials and limited higher college level materials that will also be covered in class.

Course Goals

This is a foundation course for digital electronics. Students acquire basic knowledge and skills that will be required for further advanced studies in digital electronics and microprocessors.

Course Objectives/Topics

Objective/Topic	% Course
The student will be able to use number systems and codes.	5-15%
The student will be able to demonstrate an understanding of digital electronic signals and switches.	5-15%
The student will be able to demonstrate an understanding of basic logic gates.	5-15%
The student will be able to demonstrate an understanding of the use of programmable logic devices (CPLDsand FPGAs).	5-15%
The student will be able to design combinational logic circuits and use Boolean algebra for reduction.	15-25%

The student will be able to design circuits using exclusive-OR and exclusive NOR gates.	5-15%
The student will be able to perform binary arithmetic operations and design arithmetic circuits.	10-20%
The student will be able to design and use code converters, multiplexers and demultiplexers.	10-20%

General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	**HOW DOES THE COURSE ADDRESS THE OUTCOMES** (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
Students will be able to ➢ develop meaningful questions to address problems or issues. ➢ gather, interpret, and evaluate relevant sources of information. ➢ reach informed conclusions and solutions. ➢ consider analytically the viewpoints of self and others.	Because of the mathematical nature of the course, students need to develop meaningful questions to design algorithms that solve the problems based on data they gather from datasheets, textbooks and the internet. Cooperation amongst students is imperative to succeed in this career path. This course encourages students to work in teams during lecture help sessions and labs. Assignments dealing with complex algorithms that are a slight variation on those presented in class. Assign labs that require research on the specifications of modern semiconductors used in industry today. Encourage students to share solutions and strategies during homework preparation and lab circuit design and implementation.
SOCIAL/GLOBAL AWARENESS OUTCOMES	**HOW DOES THE COURSE ADDRESS THE OUTCOMES** (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
➢ Students will begin to understand how their lives are shaped by the complex world in which they live. ➢ Students will understand that their actions have social, economic and environmental consequences.	In order to compete in today's marketplace, industries have to create products at a minimal cost. This course always considers the simplest circuit designs and cost-saving industrial automation. Research activities regarding low-cost discrete and integrated circuit components. Cover cost-saving systems approach to circuit design and implementation.

Instructional Methods

The instructor should primarily lecture on the material covered in the textbook. This should be followed by solving multiple text examples and assigning homework based on those examples. A short time, at the beginning of each class, should be used to review the solutions to the homework problems.

Methods of Assessment/Evaluation

Method	**% Course Grade**
Quizzes and Tests	40-70%
Homework	0-20%
Class discussions	0-20%
MultiSim and/or FPGA and/or lab project results	10-40%

Text(s)

Digital Electronics: A Practical Approach, 9th Edition William Kleitz, © 2012 Prentice Hall. (or equivalent)
Required:

Bibliography

Digital Electronics with VHDL: Quartus Version1st edition, Kleitz, W. Prentice-Hall: © 2006.

Digital Fundamentals. 9th edition, Floyd, Thomas L. Prentice-Hall: © 2006.

Digital Design. 2th edition, Dueck, Robert. Thomson-Delmar: © 2005.

Other Learning Resources:

Audiovisual Podcasts and automated testing available at www.prenhall.com/kleitz
Electronic www.altera.com FPGA and VHDL development software www.ni.com MultiSim Simulation Software: www.datasheetcatalog.com Discrete and IC reference
Other No resources specified