

ILLINOIS VALLEY COMMUNITY COLLEGE



Course Outline

DIVISION: Career and Technical Programs

Course: ELT 2204 - Digital Microprocessor:
Principles and Applications Electronics

Date: 2/24/09

Semester Hours: 5

Prerequisite(s): ELT 1204 or ELE 1200 or equivalent

Delivery Method:

<input checked="" type="checkbox"/> Lecture	3 Credit Hours
<input type="checkbox"/> Seminar	0 Credit Hours
<input checked="" type="checkbox"/> Lab	2 Credit Hours
<input type="checkbox"/> Clinical	0 Credit Hours
<input type="checkbox"/> Online	
<input type="checkbox"/> Blended	

Offered: Fall Spring Summer

IAI Equivalent –**Only for Transfer Courses**–go to <http://www.itransfer.org>:

CATALOG DESCRIPTION:

Introduction to basic logic gates and design procedures. Additional topics include adders, encoders, multiplexors, flip-flops, registers, counters, logic families and RAM and ROM; as well as a hands-on introduction to microprocessor principles on a discrete component level using machine level instructions. Numbering systems and logical thinking are used in conjunction with microprocessor board level training.

GENERAL EDUCATION GOALS ADDRESSED

[See the last page of this form for more information.]

Upon completion of the course, the student will be able:

[Choose those goals that apply to this course.]

- To apply analytical and problem solving skills to personal, social and professional issues and situations.
- To communicate orally and in writing, socially and interpersonally.
- To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
- To understand and use contemporary technology effectively and to understand its impact on the individual and society.
- To work and study effectively both individually and in collaboration with others.
- To understand what it means to act ethically and responsibly as an individual in one's career and as a member of society.
- To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
- To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:

1. Count and convert each number system and code to each other coded system
 - Competency 1.1 Convert Decimal Numbers
 - Competency 1.2 Convert Binary Numbers
 - Competency 1.3 Convert Octal Numbers
 - Competency 1.4 Convert Hex Numbers
 - Competency 1.5 Convert BCD Numbers
 - Competency 1.6 Convert ASCII Code
2. Give correct symbols, truth tables, and Boolean equation for each Gate
 - Competency 2.1. Analyze an Inverter
 - Competency 2.2. Analyze an Or gate
 - Competency 2.3. Analyze an AND gate
3. Give correct symbols, truth tables, and Boolean equation for each Gate
 - Competency 3.1 Analyze a NOR gate
 - Competency 3.2 Analyze a NAND gate
 - Competency 3.3 Analyze an XOR gate
 - Competency 3.4 Analyze an XNOR gate
 - Competency 3.5 Prove DeMorgan's Theorem
4. Use TTL circuits in an appropriate setting
 - Competency 4.1. Define a Digital Integrated Circuit
 - Competency 4.2. Show and use Pinouts of variable 7400 chips
 - Competency 4.3. Describe and Show TTL Characteristics
 - Competency 4.4. Build a Sinking and Sourcing Circuit
5. Use Boolean algebra and Karnaugh Maps

- Competency 5.1. Use the correct Boolean equations
- Competency 5.2. Build a Boolean equation from a circuit
- Competency 5.3. Build a circuit from a Boolean equation
- Competency 5.4. Simplify a circuit using Boolean algebra
- Competency 5.5. Build a Karnaugh Map
- Competency 5.6. Simplify a circuit using a Karnaugh Map
- 6. Use Arithmetic Logic
 - Competency 6.1. Show binary Addition
 - Competency 6.2. Show binary Subtraction
 - Competency 6.3. Use Adders in a circuit
 - Competency 6.4. Decipher negative numbers with 2's compliment
- 7. Using Flip-Flops
 - Competency 7.1. Interpret an RS latching Circuit
 - Competency 7.2. Build truth tables for D Flip-Flop
 - Competency 7.3. Build a JK Flip-Flop Circuit
- 8. Utilizing Counters and Buffers
 - Competency 8.1. Define diverse Registers and Counters
 - Competency 7.2. Build a counting circuit
- 9. Employer Expectations
 - Competency 9.1. Perform different tasks as a team member
 - Competency 9.2. Develop a time management plan
 - Competency 9.3. Develop a Trouble Shooting Plan
 - Competency 9.4. Evaluate the quality of a circuit

COURSE TOPICS AND CONTENT REQUIREMENTS:

I: Number systems and codes

1. Decimal
2. Binary
3. Codes
4. Octal
5. Hex
6. Conversions

II. Gates

1. Inverters
2. Or
3. And
4. Boolean Algebra

III. Logic Gates

1. Nor
2. Nand
3. Xor
4. Xnor
5. Demorgan's Theorems

IV. TTL Circuits

1. Digital Circuits

2. 7400 Devices
3. TTL Characteristics
4. Sinking and Sourcing
- V. Boolean Algebra and Karnaugh maps
 1. Boolean Relationships
 2. Algebraic Simplification
 3. Karnaugh Maps
 4. Pairs, Quads, and Octets
 5. Karnaugh Simplifications
- VI. Arithmetic Logic Units
 1. Binary Addition
 2. Binary Subtraction
 3. Adders
 4. Signed Numbers
 5. 2's Compliment
- VII. Flip-Flops
 1. RS Latches
 2. Clocking
 3. D Latches
 4. D Flip-Flops
 5. JK Flip-Flops
 6. Master-Slave Flip-Flops
- VIII. Registers and Counters
 1. Buffer
 2. Shift
 3. Ripple Counters
 4. Ring Counters
 5. Three State Registers
- IX. Memories
 1. ROM's
 2. PROM's and EPROM's
 3. RAM's
 4. EEPROM's
 5. TTL Memory
 6. Addressing
- X. Employer Expectations
 1. Team Work
 2. Time Management
 3. Trouble Shooting
 4. Quality

INSTRUCTIONAL METHODS:

Lecture

Demonstration

Working in groups

Think Tank Modules
Laboratory exercises
Quizzes

INSTRUCTIONAL MATERIALS:

Digital Computer Electronics, Malvino, Glenco Publishing
Simulation Software
Lab Component Hardware

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

Required assignments:	Methods of Evaluation:
Mandatory lab attendance	Short quizzes
Assigned reading	Quizzes, Tests Completion of lab assignments
Assigned homework	Lab Reports written and oral
Lab practical exam	Home work questions
	Midterm exams
	Final exam

90% - 100% A	Labs and Lab Reports	30%
80% - 89.9% B	Quizes and Tests	40%
70% - 79.9% C	Midterm and Finals	30%
60% - 69.9% D		
below 60% F		

OTHER REFERENCES

Hints for studying this course:

1. Pay close attention to the instructor's lectures. If you do not understand what he is trying to explain, hold up your hand for attention, and when recognized, clearly and concisely ask him to explain what you do not understand.
2. Take notes to study later at your leisure. Take notes even if you do not intend to study them. Just the action of taking notes re-enforces the thought in your mind.
3. Read and re-read the text assignment thoroughly. When necessary, turn back to the parts of the text you have already studied.
4. Explain to your fellow students, after class, what you have learned in class. Try to do this in your own words, not in the instructor's words, not in the textbook words. This will help you understand what you have been learning.
5. Work the assigned problems. Working and re-working the problems, and similar problems, will help you remember the steps you have taken in solving the problems, and helps in remembering what you have been taught.

6. Study. This is the most important one of all.

Form Revised: 3/2/05