Degree Applicable

Glendale Community College
February, 2003

COURSE OUTLINE

Electronics and Computer Technology 202

I. Catalog Statement

Electronics and Computer Technology 202 is a comprehensive study and applied analysis of linear integrated circuit (IC) electronics technology.

Units – 3.0
Lecture Hours – 3.0

Prerequisite: Electronics and Computer Technology 201 or equivalent.

Co-requisite: Electronics and Computer Technology 253

II. Course Entry Expectations

Skill Level Ranges: Reading 4; Writing 4; Listening/Speaking 4; Math 4.

Prior to enrolling in the course, the student should be able to:

1. construct solid-state diode and transistor circuits, using appropriate circuit components and properly follow schematic diagrams;
2. analyze and troubleshoot complex solid-state diode and transistor circuits, using proper electronics test equipment, evaluating and applying measurement results in circuit diagnostics and repairs;
3. develop and run diagnostic programs in BASIC, FORTRAN, or PASCAL that will analyze solid-state circuit parameters;
4. demonstrate critical thinking skills by attaining satisfactory scores on examination procedures solving problems in semiconductor theory and analyzing solid-state circuit theorems and concepts.

III. Course Exit Standards

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

1. design circuits using the "741" operational amplifier;
2. design circuits using both inverting and non-inverting operational amplifiers;
3. perform with AC and DC amplifiers;
4. possess a working knowledge of linear rectifiers, detectors, and AC-DC converters;
5. design clock circuits using the 555 and XR2240 timer chips;
6. design circuits for analog to digital or digital to analog circuits;
7. identify and/or design various types of power supplies.

IV. Course Content

A. Introduction to Linear ICs — 3 hours
   1. History and Development
   2. VLSI Microcircuit Construction
   3. The "741" Op Amp

B. Inverting Op Amps — 3 hours
   l. Circuit analysis
   2. Design Procedures
   3. Inverting Amp applications

C. Non-Inverting Op Amps — 3 hours
   l. Circuit Analysis
   2. Design Procedures
   3. Non-Inverting Amp Applications

D. Op Amp DC Performance — 3 hours
   l. Bias Currents
   2. Offset Current and Voltage

E. Op Amp AC Performance — 3 hours
   l. Gain and Frequency Response
   2. Slew Rate
   3. Noise
   4. Frequency Compensation

F. Detectors and Comparators — 3 hours
   l. Zero Crossing Detectors
   2. Positive-Negative Detectors
   3. Detector with Hysteresis
   4. Positive Feedback
   5. Applications

G. IC Signal Generators — 3 hours
   l. Multivibrators
   2. Triangle Wave Generators
   3. Sawtooth Wave Generators
   4. Balanced Modulators
   5. Sine Wave Generators

H. Special Circuits — 3 hours
   l. Linear Rectifiers
   2. Peak Detectors
   3. AC-DC converters
   4. Dead Zone Circuits
   5. Precision Limiters
   6. Wave Converters

I. Differential Amplifiers — 3 hours
   l. Circuit Analysis
   2. Design Procedures
   3. Applications

J. Instrument and Bridge Amplifiers — 3 hours
   l. Instrument Amplifiers
   2. Bridge Amplifiers
   3. Applications

K. Active Filters — 3 hours
   l. Introduction
   2. Circuit Analysis
   3. Design Procedures
   4. Applications

L. Multiplier Circuits — 3 hours
   l. Multiplying DC Voltages
   2. Frequency Doubling

M. Phase Angle Detection — 3 hours
   l. Basic Theory
   2. Circuit Analysis

N. IC Timers — 3 hours
   l. The 555 Timer
      a. Circuit Analysis
      b. Applications
   2. The XR2240 Programmable Timer/Counter
      a. Circuit Analysis
      b. Applications

O. D/A and A/D Conversion 3 hours
   l. DAC Characteristics
   2. ADC Characteristics
   3. Conversion Process
   4. Applications

P. Power Supplies 3 hours
   l. Unregulated Supplies
   2. DC Voltage Regulation
   3. Linear Voltage Regulators
   4. Design Procedures
   5. Applications

V. Methods of Presentation

The following instructional methodologies may be used in the course:

1. Lecture;
2. Demonstration;
3. Video tapes;
4. Guest speakers.

VI. Assignments and Methods of Evaluation

1. Pass a safety examination.
2. Final project.
3. Regular quizzes.
4. Examination at the end of each instruction module.
5. Final examination.

VII. Textbook

Berlin, Experiments with Electronic Devices. 6th ed.
10th Grade Textbook Reading Level. ISBN: 0-13-092256-0