MARICOPA COMMUNITY COLLEGES

Electronic Measurements

Course: **ELE251**	Lec + Lab **3** Credit(s) **5** Period(s) **4.4** Load
	Course Type: **Occupational**
First Term: **2004 Fall**	Load Formula: **S**
Final Term: **Current**	

Description: Application and operation of common electronic and electrical test instruments including: oscilloscopes, analog and digital multimeters, digital counters and signal sources. Transducers, amplifiers, and filters, as they apply to instrumentation systems. Laboratory reports and documentation are emphasized

Requisites: Prerequisites: A grade of C or better in ELE121.

MCCCD Official Course Competencies

1. Discuss standards used in electronic measurements. (I)
2. Define the types of errors made in measurements on physical systems. (II)
3. Describe and discuss manufacturers` specifications for test instruments. (IV)
4. Show the operation of the test instrument with the aid of block diagrams. (IV)
5. Determine the loading effect of measuring instruments placed in electronic circuits. (IV)
6. Obtain accurate and meaningful measurements using oscilloscopes and meters. (IV)
7. Organize measurement data into an engineering notebook. (III)
8. Apply signal conditioning to a transducer source. (V)
9. Use basic transducers. (VI)

MCCCD Official Course Outline

I. Units and Standards of Measurement
  A. SI system of units
  B. Classification and level of standards
  C. Physical standards
II. Measurement and Data Analysis
  A. Accuracy, precision, significant figures
  B. Error
  C. Measures of central tendency
  D. Measures of variation
III. Reports and Documentation
  A. Documentation of laboratory activity
  B. Laboratory report
IV. Test Equipment

A. Analog and digital meters
1. Accuracy statements and specifications
2. Loading effects
3. Frequency response
4. Use and application
B. Signal sources
1. Function generators
a. Specifications
b. Applications
2. Pulse generators
a. Specifications
b. Applications
3. Sweep frequency generators
a. Specifications
b. Applications
C. Oscilloscopes
1. Block systems
2. Specifications
3. Probes
4. Measuring applications and techniques
D. Digital counters
1. Frequency measurement
2. Time interval measurement
3. Specifications
E. Power sources
1. Current sources
2. Voltage sources
3. Regulatory types
4. Specifications
F. Other instrumentation and test equipment
V. Signal Conditioning
A. Amplifiers
B. Filters
VI. Transducers
A. Thermal
B. Strain
C. Displacement
D. Proximity

Last MCCCD Governing Board Approval Date: **4/27/2004**