MARICOPA COMMUNITY COLLEGES

Fabrication Techniques

Course: **ELE173**	Lec + Lab **2** Credit(s) **4** Period(s) **3.4** Load
	Course Type: **Occupational**
First Term: **2012 Fall**	Load Formula: **S**
Final Term: **Current**	

Description: Materials, tools, processes, skills and techniques used for fabricating prototype electronic systems. Topics covered will include safety, component identification, schematic diagrams, materials selection, assembly pictorials, soldering, surface-mount soldering, de-soldering/re-work, inspection, printed circuit board construction and repair, automated assembly, and Electrostatic Discharge (ESD) awareness and procedures.

Requisites: Prerequisites: None. Corequisites: ELE121.

MCCCD Official Course Competencies

1. Apply appropriate dress and work in a safe manner. (I)
2. Operate hand tools, power tools, and electronics laboratory equipment, conforming to safety standards. (I)
3. Perform ESD measurements and implement ESD control procedures. (II)
4. Identify electronic components and fundamental subsystems, symbols, schematics, and physical descriptions. (III)
5. Draw electronics symbols, schematics, and printed circuit board layouts per industry standards using a contemporary computer program. (IV)
6. Apply electronics fabrication techniques including soldering, surface-mount soldering, de-soldering, printed circuit board etching, and manual/automated assembly techniques. (V)
7. Trace schematics accurately as to circuit flow, interpret purpose, apply troubleshooting and diagnostic techniques. (VI)

MCCCD Official Course Outline

I. Safety Standards Associated applied to electronics fabrication
  A. Manufacturing Environment Safety
  B. Personal Safety Equipment Standards
  C. Ergonomics
II. ESD Protection Strategy
  A. ESD Protection Methods
  B. ESD Design Rules
  C. ESD Test Models

III. Identification and Recognition of Electronics Components and Circuits
  A. Schematic symbols
  B. Manufacturer`s ratings and specifications
  C. Physical aspects of devices in electronics
  D. Physical aspects and specifications of common subsystems such as power supplies
  E. Connectors, wire sizes and types, cable types and harnessing
  F. Coding techniques used to label components/subsystems
IV. Documentation of Electronic Circuits, Subsytems, and Systems
  A. Techniques of computer aided electronic drafting
  B. Techniques of computer aided electromechanical drawing
  C. Techniques of taping, layout, and reduction for PC boards
  D. Techniques used in computer aided design and manufacturing systems
V. Techniques of Electronic Fabrication
  A. Traditional and surface-mount soldering techniques
  B. Desoldering techniques
  C. Printed circuit board etching technique skills
  D. Electromechanical assembly and construction techniques
  E. Chassis and motherboard assembly techniques
VI. Schematic Interpretation, Troubleshooting, and Diagnostics
  A. Interpreting the schematic to construct the physical equipment
  B. Techniques of schematic tracing and wire busses
  C. Fundamentals of troubleshooting and diagnostics

Last MCCCD Governing Board Approval Date: **6/26/2012**