ELECTRONICS

Occupational Skills

The student demonstrates the specified level of competency in occupational skills:

0	1	2	3	4
No Exposure	Introduced	Practiced	Entry Level	Competency

0 1 2 3 4		
❑❑❑❑❑	A.	Basic Tools, Instrumentation and Materials
❑❑❑❑❑	B.	DC Circuits
❑❑❑❑❑	C.	AC Circuits
❑❑❑❑❑	D.	Characteristics of Solid State Devices
❑❑❑❑❑	E.	Analog Circuits
❑❑❑❑❑	F.	Digital Circuits
❑❑❑❑❑	G.	Technical Records and Reports
❑❑❑❑❑	H.	Work Place Study

DIRECTIONS

Evaluate the student by checking the appropriate box to indicate the degree of competency. The rating for each competency should reflect **employability readiness** rather than the grades given in class.

Rating Scale:
0 No Exposure
1 Introduced – The student has been exposed through non-participation instruction (e. g., lecture, demonstration, field trip, video).
2 Practiced – The student can perform the task with direct supervision.
3 Entry-level Competency – The student can perform the task with limited supervision and/or does not perform the task to standard (a typical entry-level performance expectation)
4 Competency – The student consistently performs task to standard with no supervision (on at least two occasions or at instructor's option)

0 1 2 3 4

❑❑❑❑❑ **A. Basic Tools, Instrumentation and Materials**

A.001 Practice proper industrial safety standards
A.002 Apply proper handling techniques of components
A.003 Demonstrate proper soldering techniques
A.004 Make common mechanical connections
A.005 Identify and use hand tools properly (see appendix).
A.006 Identify and use power tools properly
A.007 Construct circuits using breadboard techniques
A.008 Set up and operate the following: analog and digital multimeters, oscilloscopes, power supplies, frequency counter, signal/function generators, capacitance-inductance measurement devices, logic probes
A.009 Demonstrate proper wire wrapping techniques

❑❑❑❑❑ **B. DC Circuits**

B.001 Solve basic algebraic problems as applicable to Electronics (Program Prerequisite)
B.002 Relate electricity to nature of matter
B.003 Identify sources of electricity
B.004 Define voltage, current, resistance, power and energy
B.005 Apply and relate Ohm's Law
B.006 Read and interpret color codes to identify resistors
B.007 Measure properties of circuit using VOM and DMM meters
B.008 Compute and measure resistance of conductors and insulators
B.009 Analyze series circuits
B.010 Construct series circuits
B.011 Troubleshoot series circuits
B.012 Analyze parallel circuits
B.013 Construct parallel circuits
B.014 Troubleshoot parallel circuits
B.015 Analyze series-parallel
B.016 Construct series-parallel circuits
B.017 Troubleshoot series-parallel circuits
B.018 Analyze voltage dividers (loaded and unloaded)
B.019 Construct voltage dividers (loaded and unloaded)
B.020 Trouble shoot voltage dividers (loaded and unloaded)

B.021 Determine physical and electrical characteristics of capacitors and inductors
B.022 Define magnetic properties of circuits and devices
B.023 Analyze and measure RL and RC time constants
B.024 Solve network theorem problems using Kirchoff, (V & 1), Thevenin, Norton, Superposition, and Delta-Wye
B.025 Define maximum power transfer theory
B.027 Troubleshoot maximum power transfer theory

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C. AC Circuits

C.001 Identify properties of an AC signal
C.002 Identify AC sources
C.003 Measure AC signals using oscilloscope and frequency meters
C.004 Describe AC capacitive circuits (Series and Parallel)
C.005 Construct AC capacitive circuits (Series and Parallel)
C.006 Troubleshoot AC capacitive circuits (Series and Parallel)
C.007 Describe AC inductive circuits (Series and Parallel)
C.008 Construct AC inductive circuits (Series and Parallel)
C.009 Troubleshoot AC inductive circuits (Series and Parallel)
C.010 Apply principles of transformers to AC circuits
C.011 Describe basic RC, RL and RLC circuits (Series, Parallel and Complex)
C.012 Construct basic RC, RL and RLC circuits (Series, Parallel and Complex)
C.013 Troubleshoot basic RC, RL and RLC circuits (Series, Parallel and Complex)
C.014 Describe resonant circuit concepts
C.015 Describe basic filter circuit concepts
C.016 Apply basic trigonometric functions as applicable to electronics
C.017 Describe basic motor theory and operation
C.018 Describe basic generator theory and operation
C.019 Describe basic polyphase circuits

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D. Characteristics of Solid State Devices

D.001 Identify properties of semiconductor materials
D.002 Identify, define and measure characteristics of P-N junction diodes
D.003 Describe characteristics of special diodes
D.004 Identify, define and measure characteristics of bipolar transistors
D.005 Identify, define and measure FET characteristics
D.006 Identify, define and measure characteristics of thyristors
D.007 Describe concept of integrated circuits

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E. Analog Circuits

E.001 Describe single-stage amplifiers
E.002 Construct from schematic diagrams single-stage amplifiers
E.003 Troubleshoot single-state amplifiers
E.004 Describe multi-stage amplifiers
E.005 Describe basic power supply circuits
E.006 Construct form schematic diagrams basic power supply circuits
E.007 Troubleshoot basic power supply circuits
E.008 Describe operational amplifier circuits
E.009 Construct form schematic diagrams operational amplifier circuits
E.010 Troubleshoot operational amplifier circuits
E.011 Describe oscillator circuits
E.012 Describe cathode ray tube (CRT) operations
E.013 Describe power supply regulators
E.014 Describe active filters
E.015 Describe applications of analog circuits in: communication systems, controls systems, and instrumentations systems

0 1 2 3 4

❑❑❑❑❑ **F. Digital Circuits**

F.001 Define and apply the binary number system
F.002 Analyze logic gates
F.003 Implement logic gates
F.004 Troubleshoot basic combination logic circuits
F.005 Describe flip-flops
F.006 Construct flip-flops
F.007 Identify and define IC logic families
F.008 Describe registers and counters
F.009 Describe clock and timing circuits
F.010 Describe logic arithmetic circuits
F.011 Describe ancoders and decoders
F.012 Describe multiplexers and demultiplexers
F.013 Describe memory devices
F.014 Describe digital to analog and analog to digital conversions
F.015 Describe digital displays
F.016 Describe representative digital systems
F.017 Construct form schematic diagrams representative digital systems
F.018 Troubleshoot representative digital systems
F.019 Describe applications of digital circuits in: digital control systems and digital computer systems (data processing)

❑❑❑❑❑ **G. Technical Records and Reports**

G.001 Draw and interpret electronic schematics
G.002 Record data and design curves and graphs
G.003 Maintain test logs
G.004 Make equipment failure reports
G.005 Specify and requisition simple electronic components
G.006 Write formal reports of laboratory experiences
G.007 Compose technical letters

❑❑❑❑❑ **H. Work Place Safety**

H.001 Define and use safety terminology
H.002 Use proper safety equipment
H.003 Follow proper material control procedures, according to “Right to Know” regulations
H.004 Use tools and equipment safely
H.005 Practice good housekeeping in each work area

Appendix A

List of Common Hand Tools:

soldering irons
soldering guns
hex & spline wrench sets
cable cutter
offset screwdrivers
electric drill
screw extractor
hammers
round chassis punch
square chassis punch
metal punch
electrician’s knife
tube & parts extractors
alignment tool
wrenches
steel rules
wire stripper
chain nose pliers
curved nose pliers
combination pliers
round nose pliers
flat nose pliers
alignment screwdriver
scissors
C-clamps
nut driver
side cutting pliers
vises
heat sink