

Calhoon MEBA Engineering School

Electrical Troubleshooting Course

Part B Course Outline

rev: 11/08/95

Subject Area		Hours	
		Lecture	Laboratory
0	Orientation	2.0	0.5
	0.1 Indoctrination	1.0	
	0.2 Course Orientation	1.0	
	0.3 Lab Station Assignment/Checkout		0.5
1	Test Equipment	1.0	3.0
	1.1 The Simpson 260 VOM	0.25	1.5
	1.2 The Fluke 85 DMM	0.25	1.5
	1.3 Meter Safety	0.2	
	1.4 The Wiggins Tester	0.3	
2	R, L & C Components	1.25	1.0
	2.1 Resistance and Color Codes	0.25	1.0
	2.2 Coils, Inductance and CEMF	0.5	
	2.3 Capacitors and RC Time Constants	0.25	
	2.4 Diodes, SCRs and TRIACs	0.25	
3	Circuits	3.75	
	3.1 The Concept of Voltage	0.25	
	3.2 Current Flow	0.25	
	3.3 Continuity	0.25	
	3.4 DC vs. AC	0.25	
	3.5 Ohm's Law and Power	0.5	
	3.6 Powers of Ten	0.25	
	3.7 The Concept of Grounding	0.5	
	3.8 Open and Short Circuits	0.25	
	3.9 Series Circuit Characteristics	0.75	
	3.10 Parallel Circuit Characteristics	0.5	
4	Three-Phase Motors	2.5	2.0
	4.1 AC Induction Motor Fundamentals	0.25	
	4.2 Dual-Voltage Motor Connections	0.5	2.0
	4.3 Motor Nameplate Data	0.25	
	4.4 Motor Enclosures	0.25	

Subject Area		Hours	
		Lecture	Laboratory
4.5	Rotor Bars and Torque-Speed Characteristics	0.25	
4.6	The Rotating Field	0.25	
4.7	Sine Wave Measurements	0.25	
4.8	Squirrel-Cage Rotor	0.25	
4.9	Consequent Poles	0.25	
5	Protective Devices	1.25	
5.1	A Distribution System	0.5	
5.2	Fuse Protection	0.25	
5.3	Destructive Energy	0.25	
5.4	Fuse Classes	0.25	
6	Control System Components	1.75	3.5
6.1	Motor Control Symbols	0.25	
6.2	Types of Switches	0.25	
6.3	Control and Timing Relays	0.5	
6.4	Overload Relays	0.5	
6.5	Contactors	0.25	3.5
7	Electric Shock Hazard	0.75	1.0
7.1	Electrical Shock Effects	0.25	
7.2	Emergency Response	0.5	1.0
8	Motor Controllers	4.75	11.5
8.1	Types Of Motor Controls	0.25	
8.2	Motor Starter Comparison	0.25	
8.3	LVR and LVP Controls	0.5	
8.4	Full-Voltage Starters		
	8.4.1 Non-Reversing	0.25	
	8.4.2 Reversing	0.25	
	8.4.3 Two-Speed, One-Winding	0.5	
	8.4.4 Two-Speed, Two-Winding	0.5	
8.5	Reduced Voltage Starters		2.0
	8.5.1 Part Winding	0.5	
	8.5.2 Autotransformer	0.5	
	8.5.3 Wye-Delta	0.5	
8.6	Controller Troubleshooting	0.25	6.0
8.7	Motor Controller Trainer Practice	0.25	2.0
8.8	Solid State Controller	0.25	1.5
9	Considerations in Troubleshooting	1.0	
9.1	The Troubleshooting Process	0.5	

		Lecture	Laboratory
9.2	Techniques for Troubleshooting	0.5	
10	Programmable Logic Controller	2.25	10.5
10.1	Programmable Logic Controller Fundamentals	0.5	
10.2	Electrical vs. Logic Continuity	0.25	
10.3	Allen-Bradley SLC-150 PLC	0.5	1.0
10.4	Pocket Programmer	0.5	1.5
10.5	PLC Programming	0.5	
10.6	PLC Instructions		
	10.6.1 Branch Instructions	0.25	1.5
	10.6.2 Programming LVP Control		0.75
	10.6.3 Latch Instructions		0.75
	10.6.4 Timer Instructions	0.25	1.5
10.7	Using a PLC as a Motor Controller		1.5
10.8	Three PLC Projects		2.0
11	Miscellaneous Electrical Systems	2.0	
11.1	Emergency Switchboard Diagrams	1.0	
11.2	Forced Draft Blower	1.0	
12	Cleanup	2.25	0.5
12.1	Lab Equipment Check Out	0.25	0.5
12.2	Textbook Return	0.25	
12.3	Final Exam	1.0	
12.4	Graduation	0.75	
TOTALS		26.5	33.5
TOTAL HOURS			60