

# KELLOGG COMMUNITY COLLEGE

## INDUSTRIAL ELECTRICITY AND ELECTRONICS

2011-2012

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Unit / Module Number	Packet Title	Credit	Contact Hours	Lab Fees	Tuition	Total Cost
<b>UNIT 1 ELECTRICAL SAFETY</b>						
<input type="checkbox"/> INEL 1A	ELECTRICAL SAFETY	0.17	4	2.00	26.44	28.44
<b>UNIT TOTAL</b>		<b>0.17</b>	<b>4</b>	<b>2.00</b>	<b>26.44</b>	<b>28.44</b>
<b>UNIT 2 MATHEMATICS FOR ELECTRICIANS</b>						
<input type="checkbox"/> INEL 2A	MATHEMATICS I	0.08	2	2.00	12.44	14.44
<input type="checkbox"/> INEL 2B	MATHEMATICS II	0.25	6	15.00	38.88	53.88
<input type="checkbox"/> INEL 2C	MATHEMATICS III	0.25	6	2.00	38.88	40.88
<b>UNIT TOTAL</b>		<b>0.58</b>	<b>14</b>	<b>19.00</b>	<b>90.20</b>	<b>109.20</b>
<b>UNIT 3 ELECTRICAL THEORY</b>						
<input type="checkbox"/> INEL 3A	ELECTRICAL THEORY	0.25	6	20.00	38.88	58.88
<input type="checkbox"/> INEL 3B	STATIC ELECTRICITY	0.25	6	20.00	38.88	58.88
<input type="checkbox"/> INEL 3C	CALCULATORS & ELECTRONICS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 3D	DEVICES & SYMBOLS	0.25	6	25.00	38.88	63.88
<input type="checkbox"/> INEL 3E	MULTIMETER	0.33	8	25.00	51.32	76.32
<input type="checkbox"/> INEL 3F	OHM'S LAW	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3G	SERIES CIRCUITS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3H	PARALLEL CIRCUITS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3J	SERIES & PARALLEL CIRCUITS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3K	MAGNETISM	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 3L	ALTERNATING CURRENT	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 3M	OSCILLOSCOPE	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3N	INDUCTANCE	0.42	10	5.00	65.31	70.31
<input type="checkbox"/> INEL 3P	CAPACITANCE	0.42	10	5.00	65.31	70.31
<input type="checkbox"/> INEL 3Q	R.C.L. CIRCUITS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3R	CONDUCTION	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 3S	THEORY OVERVIEW	0.21	5	5.00	32.66	37.66
<b>UNIT TOTAL</b>		<b>5.19</b>	<b>125</b>	<b>155.00</b>	<b>807.12</b>	<b>962.12</b>
<b>UNIT 4 NATIONAL ELECTRICAL CODE (NEC)</b>						
<input type="checkbox"/> INEL 4A	GENERAL WIRING FUNDAMENTALS	0.25	6	30.00	38.88	68.88
<input type="checkbox"/> INEL 4B	WIRE, RACEWAY & BOX SIZING	0.33	8	30.00	51.32	81.32
<input type="checkbox"/> INEL 4C	BRANCH CIRCUITS	0.33	8	30.00	51.32	81.32
<input type="checkbox"/> INEL 4D	SERVICE & FEEDER CALCULATIONS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 4E	GROUNDING & BONDING	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 4F	OVERCURRENT PROTECTION	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 4G	MOTOR CIRCUIT WIRING	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 4H	TRANSFORMERS	0.25	6	10.00	38.88	48.88
<input type="checkbox"/> INEL 4J	GENERAL HAZARDOUS LOCATIONS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 4K	HEALTH CARE FACILITIES	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 4L	EMERGENCY POWER SYSTEMS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 4M	INDUSTRIAL APPLICATIONS	0.33	8	10.00	51.32	61.32
<input type="checkbox"/> INEL 4N	SPECIAL APPLICATION WIRING	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 4P	NEC REVIEW	0.17	4	5.00	26.44	31.44
<b>UNIT TOTAL</b>		<b>3.90</b>	<b>94</b>	<b>155.00</b>	<b>606.52</b>	<b>761.52</b>

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<b>UNIT 5 ELECTRICAL MOTOR CONTROLS 1</b>							
<input type="checkbox"/>	WBEL 5A	ELECTRICAL MOTOR CONTROLS	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 5B	MANUAL MOTOR CONTROL	0.50	12	10.00	77.75	87.75
<input type="checkbox"/>	WBEL 5C	CONTROL TRANSFORMERS	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 5D	CONTROL LADDER LOGIC	0.67	16	10.00	104.19	114.19
<input type="checkbox"/>	WBEL 5E	CONTROL RELAYS & MOTOR STARTER	0.50	12	10.00	77.75	87.75
<input type="checkbox"/>	WBEL 5F	INTRO TO TROUBLESHOOTING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 5G	SYSTEMS TROUBLESHOOTING	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 5H	AUTOMATIC INPUT DEVICES	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 5J	ELECTRONIC SENSORS	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 5K	BASIC TIMER CONTROL	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 5L	TIMERS & COUNTERS	0.25	6	10.00	38.88	48.88
<b>UNIT TOTAL</b>			<b>4.59</b>	<b>110</b>	<b>110.00</b>	<b>713.77</b>	<b>823.77</b>
<b>UNIT 6 ELECTRICAL MOTOR CONTROLS 2</b>							
<input type="checkbox"/>	WBEL 6A	REVERSING MOTOR CONTROL	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6B	BRAKING METHODS	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 6C	REDUCED VOLTAGE STARTING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6D	INTRO TO FREQ DRIVERS (AC)	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6E	AC DRIVERS/SPEED/TORQUE CONTR	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6F	ACDRIVERS/ACCEL & DECELLERAT	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6G	ACDRIVERS/TROUBLESHOOTING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 6H	SCR MOTOR CONTROL	0.42	10	10.00	65.31	75.31
<b>UNIT TOTAL</b>			<b>2.82</b>	<b>68</b>	<b>80.00</b>	<b>438.54</b>	<b>518.54</b>
<b>UNIT 8 POWER DISTRIBUTION SYSTEMS</b>							
<input type="checkbox"/>	WBEL 8A	POWER GENERAT & DISTRIBUTION	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 8B	ELECTRICAL WIRING TECHNIQUES	0.33	8	10.00	51.32	61.32
<input type="checkbox"/>	WBEL 8C	WIRING SYSTEM INSTALLATION	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 8D	INTRO TO RACEWAYS	0.42	10	10.00	65.31	75.31
<input type="checkbox"/>	WBEL 8E	BASIC CONDUIT BENDING	0.25	6	10.00	38.88	48.88
<input type="checkbox"/>	WBEL 8F	ADVANCED RACEWAYS	0.25	6	10.00	38.88	48.88
<input type="checkbox"/>	WBEL 8G	CONDUCT & OVERCURRENT PROTECT	0.25	6	10.00	38.88	48.88
<input type="checkbox"/>	WBEL 8H	CONDUIT SIZING & WIRE PULLING	0.33	8	10.00	51.32	61.32
<b>UNIT TOTAL</b>			<b>2.58</b>	<b>62</b>	<b>80.00</b>	<b>401.22</b>	<b>481.22</b>
<b>UNIT 9 FACILITY MAINTENANCE</b>							
<input type="checkbox"/>	INEL 9A	PLANS & SITEWORK	0.25	6	15.00	38.88	53.88
<input type="checkbox"/>	INEL 9B	INDUSTRIAL POWER SYSTEMS	0.42	10	15.00	65.31	80.31
<input type="checkbox"/>	INEL 9C	SIGNALING SYSTEMS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 9D	MOTORS, CONTROLLERS & INSTALLA	0.33	8	5.00	51.32	56.32
<input type="checkbox"/>	INEL 9E	SPECIAL EQUIPMENT & HVAC	0.33	8	5.00	51.32	56.32
<input type="checkbox"/>	INEL 9F	INDUSTRIAL HAZARDOUS LOCATIONS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 9G	SINGLE PHASE TRANSFORMERS	0.33	8	15.00	51.32	66.32

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<b>UNIT 9 FACILITY MAINTENANCE (continued)</b>						
<input type="checkbox"/> INEL 9H	3 PHASE TRANSFORMERS	0.50	12	15.00	77.75	92.75
<input type="checkbox"/> INEL 9J	NEC TRANSFORMER REQUIREMENTS	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 9K	EMERGENCY ELECTRICAL SYSTEMS	0.25	6	5.00	38.88	43.88
<b>UNIT TOTAL</b>		<b>3.16</b>	<b>76</b>	<b>90.00</b>	<b>491.42</b>	<b>581.42</b>
<b>UNIT 10 ELECTRICAL CONTROL WIRING</b>						
<input type="checkbox"/> WBEL 10A	ELECTRICAL CONTROL WIRING	0.42	10	10.00	65.31	75.31
<input type="checkbox"/> WBEL 10B	ELECTRICAL CONTROL SYSTEMS	1.00	24	25.00	155.50	180.50
<b>UNIT TOTAL</b>		<b>1.42</b>	<b>34</b>	<b>35.00</b>	<b>220.81</b>	<b>255.81</b>
<b>UNIT 11 INDUSTRIAL ELECTRONICS</b>						
<input type="checkbox"/> INEL 11A	USING THE OSCILLOSCOPE	0.67	16	5.00	104.19	109.19
<input type="checkbox"/> INEL 11B	METERS FOR ELECTRONICS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 11C	ELECTRONIC SOLDERING	0.25	6	35.00	38.88	73.88
<input type="checkbox"/> INEL 11D	SOLDERING PC BOARDS	0.25	6	35.00	38.88	73.88
<input type="checkbox"/> INEL 11E	DIODES	0.25	6	5.00	38.88	43.88
<input type="checkbox"/> INEL 11F	POWER SUPPLIES	0.50	12	10.00	77.75	87.75
<input type="checkbox"/> INEL 11G	PHOTO DEVICES	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 11H	SOLID STATE DEVICES	0.83	20	5.00	129.07	134.07
<input type="checkbox"/> INEL 11J	ELECTRONIC TIMING	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 11K	AMPLIFIERS	0.83	20	5.00	129.07	134.07
<input type="checkbox"/> INEL 11L	DIGITAL LOGIC FUNDAMENTALS	0.50	12	5.00	77.75	82.75
<input type="checkbox"/> INEL 11M	DIGITAL LOGIC APPLICATIONS	0.42	10	5.00	65.31	70.31
<input type="checkbox"/> INEL 11N	PROXIMITY SWITCHING	0.17	4	5.00	26.44	31.44
<input type="checkbox"/> INEL 11P	PHOTOELECTRIC DEVICES	0.17	4	5.00	26.44	31.44
<input type="checkbox"/> INEL 11Q	FIBER OPTICS FUNDAMENTALS	0.33	8	5.00	51.32	56.32
<input type="checkbox"/> INEL 11R	FIBER OPTICS-LAB	0.25	6	5.00	38.88	43.88
<b>UNIT TOTAL</b>		<b>6.41</b>	<b>154</b>	<b>145.00</b>	<b>996.82</b>	<b>1141.82</b>
<b>UNIT 12 PROGRAM LOGIC CONTROLLERS 1</b>						
<input type="checkbox"/> WBEL 12A	INTRO TO PROGRAM CONTROLLERS	0.25	6	10.00	38.88	48.88
<input type="checkbox"/> WBEL 12B	BASIC PLC PROGRAMMING	0.50	12	10.00	77.75	87.75
<input type="checkbox"/> WBEL 12C	PLC MOTOR CONTROL	0.50	12	10.00	77.75	87.75
<input type="checkbox"/> WBEL 12D	DISCRETE I/O INTERFACING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/> WBEL 12E	INTRO TO PLC TROUBLESHOOTING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/> WBEL 12F	PLC SYSTEMS TROUBLESHOOTING	0.33	8	10.00	51.32	61.32
<b>UNIT TOTAL</b>		<b>2.24</b>	<b>54</b>	<b>60.00</b>	<b>348.34</b>	<b>408.34</b>
<b>UNIT 13 PROGRAM LOGIC CONTROLLERS 2</b>						
<input type="checkbox"/> WBEL 13A	EVENT SEQUENCING	0.33	8	10.00	51.32	61.32
<input type="checkbox"/> WBEL 13B	APPLICATION DEVELOPMENT	0.50	12	10.00	77.75	87.75
<input type="checkbox"/> WBEL 13C	PLC TIMER INSTRUCTIONS	0.50	12	10.00	77.75	87.75
<input type="checkbox"/> WBEL 13D	PLC COUNTER INSTRUCTIONS	0.50	12	10.00	77.75	87.75

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<b>UNIT 13      PROGRAM LOGIC CONTROLLERS 2 (continued)</b>							
<input type="checkbox"/>	WBEL 13E	PROGRAM CONTROL INSTRUCTIONS	0.50	12	10.00	77.75	87.75
<input type="checkbox"/>	WBEL 13F	MATH & DATA MOVE INSTRUCTIONS	0.58	14	10.00	90.19	100.19
<b>UNIT TOTAL</b>			<b>2.91</b>	<b>70</b>	<b>60.00</b>	<b>452.51</b>	<b>512.51</b>
<b>UNIT 14      PANEL VIEW</b>							
<input type="checkbox"/>	INEL 14A	INTRO TO PANEL VIEW	0.17	4	5.00	26.44	31.44
<input type="checkbox"/>	INEL 14B	TERMINAL OVERVIEW	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 14C	WIRING AND SET UP	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 14D	CONFIGURING THE TERMINAL	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 14E	TROUBLESHOOTING & MAINTENANCE	0.25	6	5.00	38.88	43.88
<input type="checkbox"/>	INEL 14F	PROGRAMMING PANEL VIEW	0.83	20	20.00	129.07	149.07
<input type="checkbox"/>	INEL 14G	PANEL VIEW & PLC APPLICATIONS	1.04	25	20.00	161.72	181.72
<input type="checkbox"/>	INEL 14H	PANEL VIEW & PLC COMMUNICATION	0.21	5	5.00	32.66	37.66
<b>UNIT TOTAL</b>			<b>3.25</b>	<b>78</b>	<b>70.00</b>	<b>505.41</b>	<b>575.41</b>
<b>PROGRAM TOTAL</b>			<b>39.22</b>	<b>943</b>	<b>1061.00</b>	<b>6099.12</b>	<b>7160.12</b>

**FOR OFFICE USE ONLY**

Instructor Approval \_\_\_\_\_ Date \_\_\_\_\_

Total Credit \_\_\_\_\_ Total Contact \_\_\_\_\_ Total Cost \_\_\_\_\_