

# Budget for The Integrated Electric Energy Systems Laboratory

**Power Systems Laboratory:** Software-based

**Power Electronics Laboratory:** 5 stations

**Electric Drives Laboratory:** 1 station to be accessed by Remote Desktop

Item	Description	Distributor (Manufacturer)	Dist.# (Model#)	Unit Cost	Quantity	Cost 5 stations
DSP Board Kit		dSPACE	ACE1104	\$5,300.00	1	\$5,300.00
Motor Sets		Motorsolver LLC		\$3,150.00	1	\$3,150.00
Drives Board		HiRel Systems		\$1,200.00	1	\$1,200.00
Oscilloscope	100Mhz,4 Channel	Newark (Tektronix)	70C4293 (TDS2014)	\$1,945.13	5	\$9,725.65
Desktop PC		Dell Corporation		\$1,000.00	5	\$5,000.00
<b>Power-Pole Board for PE Lab, Additional Equipment &amp; Accessories</b>				\$3,160.90	5	\$15,804.50
Software License						\$100.00
<b>Total</b>						<b>\$40,280.15</b>

## Explanation

- 1) DSP Board Kits are by dSPACE, Inc. Their normal university prices.
- 2) Quotation for the Motor Set prices from Motorsolver LLC
- 3) Drives board consists of two switch-mode converters to provide power to electric motors. These boards are designed by Univ of Minnesota.
- 4) PCs are required for MATLAB/SIMULINK simulations and for using DSP boards from dSPACE Inc.
- 5) Software Licenses \$100.00  
-RTI Library from MathWorks for 1 PC : \$100
- 6) Power-Pole Board for PE Lab, Additional Equipments & Accessories per station

Power-pole Board		(HiRel Systems; previously Schott)		1	\$800.00
Power Supply		DIGIKEY (BKPrecision)	BK1730-ND (BK1730)	1	\$319.00
Signal Power Supply	12V,0.3A;-12V,0.3A	Newark (Elpac Power Supply)	16F121 (WM072-1950-D5)	1	\$38.22
External Device module	Communicates to	Newark (Tektronix)	70C4290(TDS2CMA)	1	\$258.58
Differential Probe	100MHz	Newark (Tektronix)	83F2204 (P5200)	1	\$609.38
Function Generator	0.2Hz - 2MHz	DIGIKEY (BKPrecision)	BK4010A-ND (BK4010A)	1	\$250.00
Digital Multimeter		DIGIKEY (BKPrecision)	BK390A-ND (BK390A)	1	\$167.00
Plug in board	20 pin proto board	DIGIKEY (Capital Advanced)	5020CA-ND (US-5020)	2	\$6.62
Crimp Connectors	spade crimp	DIGIKEY	A27229-ND	10	\$3.20
BNC Cable	3 feet	NEWARK (Pomona Electronics)	94B4227 (2249-Y-36)	2	\$48.96
BNC Cable	2 feet	NEWARK (MCM Electronics)	35F1073 (2249-C-24)	2	\$33.04
BNC Mini Graber		NEWARK (Pomona Electronics)	35F1061 (3788)	1	\$11.76
Rheostat		NEWARK (Dale)	95F8755 (MP30A150)	1	\$60.11
Rheostat Knob		NEWARK (Dale)	96F901 (552)	1	\$2.99
Banana Wire	Black	NEWARK (Pomona Electronics)	83F8103 (1440-36-0)	8	\$61.52
Banana Wire	Red	NEWARK (Pomona Electronics)	83F8103 (1440-36-2)	8	\$61.52
Power Supply		TestMart (EZ Digital)	GP-505	1	\$429.00

**\$3,160.90**