

Electrical Power Fundamentals

RENG 121 – 5 Credits/\$400 – December 2010

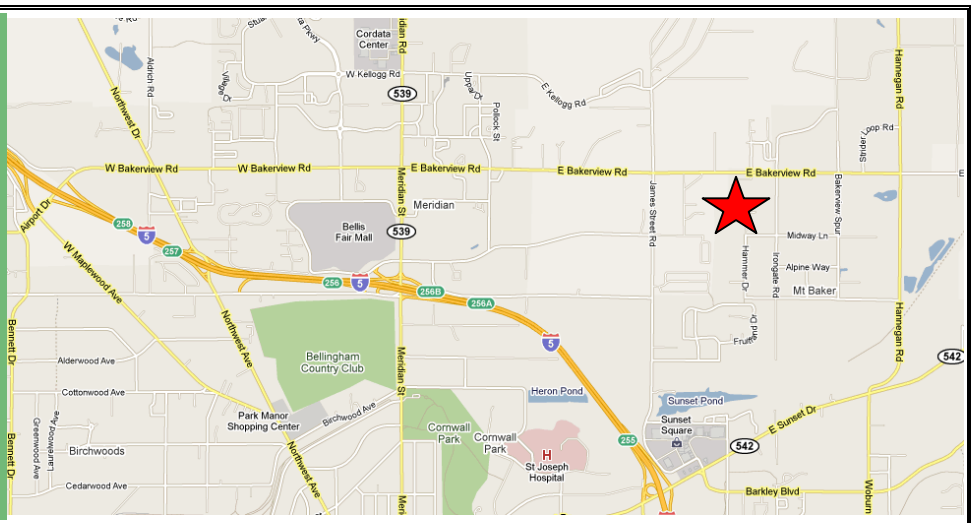


Class Description:

This class provides an overview of DC-Direct Current and AC-Alternating Current for students just beginning their study of electricity/electronics/Renewable Energy`. Atomic theory, structure of atoms and magnetism will help students develop a deeper understanding of electricity. Current, voltage and resistance (“The Big 3”) will be introduced. By building circuits and using power formulas and Ohm’s Law, students will discover the relationship between the “Big 3” in DC circuits. By gaining an understanding of power dissipation, fuses, loads, etc. students will begin to understand the inner workings of simple circuits. The difference between an “open” and a “short” will be discussed. Different types of circuits will be introduced. The Digital Multi Meter (or DMM) will be used for measuring voltage, current and resistance. The molecular difference between conductors and insulators will be demonstrated. Students will also measure their own body resistance. Methods of producing DC and AC will be introduced. AC cycles, peak , average and effective values will be discussed. Frequency and phase (single and three phase) will also be introduced. Other AC considerations, including harmonics, wavelength and period will be introduced.

Location:

**Building Industry Association of
Whatcom County
1650 Baker Creek Place
Bellingham, WA 98226**



Dates and Times:

The class is scheduled to run on **Tuesdays, Thursdays, and Saturdays** from **November 16th to December 16th** (taking **Thanksgiving and Thanksgiving weekend off**). This provides (13) three-hour classes to cover the course material. Please see the Class Calendar on the third page for course material.

Cost, Capacity, and Registration:

Tuition for this class is \$400. Tuition must be paid before the class begins. Program enrolled students have seniority for this class and should register online three-weeks before the class begins. Continuing education students may begin registering online two-weeks before the class begins. Students may also send class registrations by mail to the following address: Washington Engineering Institute, PO Box 483, Custer WA 98240

School Provided Materials:

- Oscilloscopes and 1x/10x Passive Oscilloscope Probes
- ELENCO XK-550 or XK-150 Analog/Digital Trainers
- Various handouts and lecture notes

Student Provided Materials:

- **Textbook:** Electricity and Electronics, 4th Edition, by Stan Gibilisco, published by TAB, ISBN: 0-07-145933-2. Available at amazon.com used and new.
- **Digital Multimeter** (auto-ranging and capable of measuring milli-amps in DC and AC. Local Radio Shack, BTC Bookstore, or www.omnitronelectronics.net. Two students could share a multimeter.
- **EXP-50B** a 50-in-1 Training Lab parts kit. Available at www.omnitronelectronics.net. Two students could share this parts kit.
- **Hand Tools:** Side cutters (wire cutters, 4"/small size), wire strippers (down to 20 or 22 gauge wire), needle nose pliers (4"/small size). Local hardware store or BTC Bookstore.
- **3-Ring Binder & Scientific Calculator** (Get one that you can operate!)

Instructor

Jim Swartos

Experience: 30 years of experience in the field of electronics including troubleshooting, preventative maintenance and repair of a broad range of electron devices including: transmitters, receivers, audio, fiber optics, control circuits, and switching systems. Most recent experience was as the Electronics Technology instructor at Bellingham Technical College from 1999-2010.

Format:

Typical Class Structure:

6:00 PM – Attendance, review homework & topics
6:50 PM – Break
7:00 PM – Labs
7:50 PM – Break
8:00 PM – Finish labs
8:30 PM - Quiz, Give out assignments
8:50 PM - Final thoughts
9:00 PM - See you next time!

Final Drawing Exam and Grades:

Grades will be determined by class attendance (10%), homework (25%), labs 25%, quizzes 15% and tests 25%. See grade sheet for details on attendance, homework, etc. scores/grades.

November/December 2010 – Electrical Power Fundamentals – RENG 121

| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|--------|--|-----------|--|--------|--|--------|
| 15 | 16 6:00PM-9:00PM Introduction, DC Theory, Magnetism | 17 | 18 6:00PM-9:00PM Resistance, Voltage & Current | 19 | 20 9:00AM-12noon Different Types of Circuits | 21 |
| 22 | 23 6:00-9:00 PM Ohm's Law, Power Formulas | 24 | 25 THANKSGIVING - NO CLASS | 26 | 27 | 28 |
| 29 | 30 6:00-9:00 PM Power Dissipation, Fuses, Loads | 1 | 2 6:00-9:00 PM Opens, Shorts | 3 | 4 9:00AM-12noon Insulators, Conductors | 5 |
| 6 | 7 6:00-9:00 PM Producing DC, AC Introduction | 8 | 9 6:00-9:00 PM AC Waveforms | 10 | 11 9:00AM-12noon Frequency, Phase | 12 |
| 13 | 14 6:00-9:00 PM Single Phase, Three Phase, Harmonics, Wavelength, Period | 15 | 16 6:00-9:00 PM Review, Final Exam | 17 | 18 9:00AM-12noon Redo/Make-up if needed | 19 |



PO Box 483
 Custer WA 98240
admin@weiedu.org
 (360) 739-1428

Class Registration Form 2010 v2.0

Returning students with a Student ID do not need to fill out the gray portions of this form.

| | |
|----------------|--|
| Name | |
| Address | |
| Phone | |
| Email | |

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|---------------------------|---|
| Class Requested | RENG 121 – Electrical Power Fundamentals |
| Class Month / Date | December 2010 |

WAC 490-105-160 – State Licensed School Reporting Requirements:

| | | |
|-------------------------------------|--|--|
| Student ID # | | |
| SSN # | | |
| Date of Birth | | |
| Gender | | |
| Disability | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Race | <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Hawaiian Native or Pacific Islander <input type="checkbox"/> Hispanic <input type="checkbox"/> White/Caucasian <input type="checkbox"/> Multi-racial <input type="checkbox"/> Other | |
| Prior Education | <input type="checkbox"/> Less than high school graduation <input type="checkbox"/> GED <input type="checkbox"/> High School Graduate <input type="checkbox"/> Post H.S., no degree or certificate <input type="checkbox"/> Associate Degree <input type="checkbox"/> Bachelor Degree <input type="checkbox"/> Master or Doctorate Degree | GED Year _____ Graduation Year _____ Graduation Year _____ Graduation Year _____ Graduation Year _____ |
| Name of Last School Attended | | |

Student Signature

Date