

## **2017 NEC Electrical Theory – 8 hour Course Outline**

2017 NEC Electrical Theory and Calculations is designed to meet 8 hours of Continuing Educations Units (CEUs) for electrical license renewal in Colorado, well as many other states. The course curriculum covers Ohm's Law and voltage drop, general lighting and receptacle calculations, range and dryer calculations, fixed appliance calculations, sizing grounding conductors, motor calculations, generator calculations, welder calculations, transformer formulas and calculations, miscellaneous commercial calculations, and service calculations for residential and commercial installations.

### **Element 1 – Ohm's Law and Voltage Drop, General Lighting and**

**Receptacle Calculations** – Basic Ohm's Law and single-phase and three-phase voltage drop are covered as well as general lighting calculations for one-family and multifamily dwellings. Included are practice review questions and answers.

Total time: 57 minutes and 33 seconds

### **Element 2 – General Lighting and Receptacle Calculations *continued***

– General lighting and receptacle calculations are continued adding small appliances and laundry circuits and applying appropriate demand factors for single and multifamily dwellings. Also covered are lighting loads in other than dwelling units and the application of demand factors in various types of occupancies. Included are practice review questions and answers.

Total time: 50 minutes and 57 seconds

### **Element 3 – General Lighting and Receptacle Calculations *continued*, Cooking Equipment Calculations, and Dryer Calculations**

– General lighting and receptacle calculations are continued in various commercial applications. Cooking equipment calculations include household electric ranges in both single and multifamily dwellings as well as kitchen equipment in other than dwelling units. Household electric clothes dryers in single family and multifamily dwellings are also covered. Included are practice review questions and answers.

Total time: 55 minutes and 35 seconds

### **Element 4 – Fixed Appliance Calculations, and Grounding and**

**Bonding** – Fixed appliance calculations in dwelling units are explained. Article 100 definitions that apply to grounding and bonding are clarified and illustrated. Sizing grounding electrode conductors for grounded ac services and separately

derived systems utilizing various grounding electrodes are also covered. Included are practice review questions and answers.  
Total time: 59 minutes and 1 second

**Element 5 – Grounding and Bonding *continued*** – Sizing grounding conductors are further explored focusing on main or system bonding jumpers and equipment bonding jumpers on the supply side of the service. Many examples are given for sizing the main grounding components of electrical services of various sizes. Included are practice review questions and answers.  
Total time: 58 minutes and 14 seconds

**Element 6 – Grounding and Bonding *continued*, and Motor Calculations** – Grounding and bonding is further discussed, focusing on equipment bonding jumpers and equipment grounding conductors installed on the load side of the main service. Conductors are sized for various types of motors, including multiple motor applications, as well as short-circuit and ground-fault protection. Included are practice review questions and answers.  
Total time: 60 minutes and 1 second

**Element 7 – Generator Calculations, Welder Calculations, Transformer Formulas and Calculations, Miscellaneous Commercial Calculations, and Single Family Service Calculations** – The sizing of conductors for generators and single and multiple welders are explained. Transformer formulas and calculations are also illustrated. Also covered are miscellaneous commercial calculations such as general purpose receptacles, fixed multipurpose assemblies, heating and air conditioning, and sign circuits. The six basic areas of a single family service calculation are introduced. Included are practice review questions and answers.  
Total time: 57 minutes and 17 seconds

**Element 8 – Single Family Service Calculations *continued*, Multifamily Service Calculations, Mobile Home Park Calculations, Recreational Vehicle Park Calculations, and Commercial Service Calculations** – Single family service calculations are continued along with multifamily service calculations. Also covered are mobile home park calculations, recreational vehicle park calculations and commercial service calculations. Included are practice review questions and answers.  
Total time: 58 minutes and 12 seconds