



# ELECTRICAL 101

## COURSE SYLLABUS AND LESSON PLAN

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25 Instruction Hours ♦ 62.5 Study Hours ♦ Self-paced—completed within 1 to 12 Months

No Prerequisites ♦ Certificate in Electrical Theory ♦ Distance Education only; Online only

**COURSE DESCRIPTION:** The Electrical Course gives students a broad understanding of the electrical trade. Students will study everything from electrical theory and the National Electrical Code® to blueprint reading, residential wiring, electronic control systems, motor theory and application and much more. Foundational principles of electricity, such as electric current, Ohm’s Law, and circuits are explained in detail. Students learn the tools of the trade and critical safety procedures. All common electrical components are demonstrated including such items as device boxes, raceways and fittings, fasteners and anchors, conductors and cables and more. The course also includes electrical device troubleshooting and repair. This course prepares students for non-licensed, entry-level work as an electrician’s helper. Students study and complete the course at a pace they control. Students must study with sufficient retention of the knowledge to pass their exams with a score of 80% or higher.

**COURSE OBJECTIVE:** Upon successful completion, this course results in trade knowledge certification for entry-level electrical trade workers, maintenance employees and do-it-yourself home and business owners. This Electrical Course prepares an individual to enter employment in positions involving Maintenance Electrician, Electrician Assistance and the electrical work involved in General Maintenance and Repair positions such as Maintenance Mechanic, Facilities Maintenance Technician, and Building Maintenance and Repair Technician. *(See Standard Occupational Classifications 47-3013, 49-9042, 47-3019 and 49-9799 Idaho Department of Labor.)*

- ***This course is NOT intended to lead to becoming a Licensed Electrician.***
- *General Maintenance and Repair (SOC 49-9042 Idaho Department of Labor, SOC 49-9071 US Department of Labor), is a non-licensure occupational classification as are various trade assistant jobs in electrical , including but not limited to (49-3015, Helpers-Pipelayers, Plumbers, Pipefitters, Steamfitters [US Department of Labor]). For more occupational information on these and related SOC’s go to: [www.onetonline.org](http://www.onetonline.org).*
- *Only employees working on their employer’s premises, or individuals working on their own residence, may perform electrical work without a Journeyman or Contractor’s License. A self-employed individual may not perform any electrical work (except on their own residence) without an Electrical Contractor’s License. Additionally, maintenance employees are prohibited from certain types of electrical work without a license (e.g., electrical tasks such as adding new circuits or installing additional switches). Permissible tasks are repairing and replacing of existing*



*electrical systems, operating electrical systems, and working directly with licensed Electrical Journeymen.*

## **Electrical Course Syllabus (continued)**

- *Certificates of this School do not qualify an individual to work as a licensed Electrician, or as a licensed Contractor.*
- *Students are prohibited from doing any electrical work outside of their own residence unless the student is concurrently employed in maintenance, engaging in repair and maintenance of existing electrical work on the employer's premises. When installing new electrical systems, the student must be working under the constant supervision of a licensed Journeyman Electrician or Electrical Contractor.*
- *In order to become a licensed Electrician, an individual must be at least 16 years of age, register as an apprentice electrician, be employed by a licensed Electrical Contractor, complete work under constant supervision of a licensed Electrician Journeyman or Master employed by the Electrical Contractor, and be enrolled in or have completed a four-year training program at an approved school. In order to become a licensed Journeyman Electrician, an individual must have completed 8,000 hours of qualified electrical work as a registered apprentice under the constant supervision of a licensed Journeyman or Master Electrician, and passed the licensure exam.*
- *For more information, go to <http://dbs.idaho.gov>.*

**EQUIPMENT AND MATERIALS USED IN THIS COURSE:** Equipment and materials used in this course include: An internet-capable computer, internet connection, web browser, online examinations.

**VIDEO INSTRUCTION:** *Professional Electrical Course.* Director Gene Kelly, Producer Keith Hezmalhalch, Instructors Mike Chirco and Mark Elola. DVD. Accelerated Technical Training Institute (ATTI), 2014.

**INSTRUCTIONAL MODE:** Distance education not in real time. All instruction is provided via pre-recorded video lessons and online examinations.

**FREQUENCY OF LESSONS:** Lessons occur at a time and location determined by the student.

**METHOD OF INSTRUCTION:** This course is taught in pre-recorded video instruction; however, the students can access instructors whenever they have technical questions or need assistance with completing the coursework. Students submit their questions by email to [faculty@atitradeschools.com](mailto:faculty@atitradeschools.com), after which they will receive an email reply and/or a telephone call from a Student Support Specialist.

**TESTING AND CERTIFICATE REQUIREMENTS:** When you complete the video instruction in the Electrical Course, you will take an online examination to test your knowledge. You may optionally complete an end-of-chapter quiz. Quizzes are optional study tools to support passing your final exam.



Exams are online, not timed, and are open book, open video. Once started, an online exam may be suspended but must be completed within 60 days. When you pass your final exam with a score of 80% or higher, you will receive an Electrical Theory Certificate.

## Electrical Course Syllabus (continued)

**GRADING SYSTEM:** Students are graded on a pass/fail basis.

Passing Grade: A passing grade is given to a student who achieves a score of 80% or higher on all examinations in the Electrical Course.

Failing Grade: A failing grade is given to a student who has failed to achieve a score of 80% or higher on all examinations in the Electrical Course.

## Electrical Course Lesson Plan

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 1 - Introduction</b> Course Introduction History		
<b>Chapter 2 - Safety</b> Basic Personal Protection Equipment Workplace Safety Power Tool Safety		
<b>Chapter 3 – Tools</b> Hand Tools Power and Specialized Tools		
<b>Chapter 4 – The National Electrical Code (NEC)</b> The National Electric Code (NEC)		
<b>Chapter 5 – Electrical Boxes</b> Electrical Boxes Metal Boxes		
<b>Chapter 6 – Conduit</b> Bending Conduit – 90 Degree Bends		



Bending Conduit – Offset Bends		
Bending Conduit – Parallel Offset		
Bending Conduit – Saddle Bends Pt. 1		

## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 6 – Conduit (Continued)</b> Bending Conduit – Saddle Bends Pt. 2 Bending Conduit – More Benders Bending Conduit – Review of Bends Bending Conduit – Metal Conduit Cutting Conduit Cutting Conduit – The Hacksaw Cutting Conduit – Sawzall and Review Cutting Conduit Cutting Conduit – The Hacksaw Cutting Conduit – Sawzall and Review		
<b>Chapter 7 – Raceways</b> Types of Raceways FMC to Conclusion Conduit Fittings Conduit Fittings Pt. 2 Conduit Bodies Supports Review and In the Field		
<b>Chapter 8 – Fasteners and Anchors</b> Fasteners Anchors and Bolts One Step Anchors		
<b>Chapter 9 – Conduit Boxes</b>		



Electrical – Conduit Boxes – Pre-Install		
Electrical – Conduit Boxes – Install		
Electrical – Conduit Boxes – Install Pt. 2		
<b>Chapter 10 – Wiring</b>		
Screw Terminals		
Completing Raceway Wiring		
Conductors		



## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<p><b>Chapter 10 – Wiring (Continued)</b></p> <ul style="list-style-type: none"> <li>Wires Overview</li> <li>Installing Wire</li> <li>Drilling Through Studs</li> <li>Running Wire</li> <li>Terminating Wire</li> <li>Wire Bends</li> <li>Stripping Wire</li> <li>Crimping Wire</li> <li>Placing A Lug</li> <li>Wire Nuts</li> <li>Splicing Wires</li> <li>Terminating Wire</li> <li>Terminating Switches</li> <li>Ground Fault Circuit GFCI</li> <li>Terminating Light Fixtures</li> <li>Push Terminals</li> <li>Raceway Wiring Fixture</li> <li>Raceway Wiring Switch</li> </ul>		
<p><b>Chapter 11 – Theory</b></p> <ul style="list-style-type: none"> <li>Atomic Theory</li> <li>Introduction</li> <li>Series Circuits</li> <li>Series Circuits Pt. 2</li> <li>Troubleshooting Series Circuit</li> <li>Parallel Circuits</li> <li>Parallel Formulas</li> <li>Parallel Rules</li> <li>Parallel Rules Pt. 2</li> </ul>		



## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 12 – Magnetism (continued)</b> Magnetic Devices Transformers		
<b>Chapter 13 – A.C. Theory</b> Introduction AC VS DC AC VS DC Pt. 2 Transformers and AC Utility Companies and AC Converting AC to DC Converting AC to DC Pt. 2		
<b>Chapter 14 – Inductors and Capacitors</b> Inductors Capacitors RC Circuits Farads Capacitors in Series and Parallel Capacitive Reactance Phase Relationship Electrical – Power Factory Summary		
<b>Chapter 15 – Electrical Blueprints</b> Electrical Blueprints		
<b>Chapter 16 – Residential Wiring</b> Conductors Pt. 1 Conductors Pt. 2 Choosing Conductors Ampacity Service Equipment Residential Wiring Code Process		



Plan Review		
Drawing Package		
NEC Requirements		

## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 16 – Residential Wiring (Continued)</b> Plan View of Receptacle Layout GFCI Receptacles Assigning Circuits Special Purpose Outlets Location of Service Equipment Code Requirements for Location and Mounting Review of Lighting Circuit Requirements Service Panel Setup Load Calculations Sizing the Wire Grounding Systems Over Current Devices AFCI Multi-Wire Circuits Building Sequence Sizing Feeder Wire Wiring Drilling Studs Rough-in Inspection Pt. 1 Rough-in Inspection Pt. 2 Rough-in Inspection Pt. 3 Rough-in Inspection Pt. 4 Epilogue Pt. 1 Epilogue Pt. 2 Epilogue Pt. 3		
<b>Chapter 17 – Fundamental Concepts</b> Relays		





Motor Controller		
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## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 17 – Fundamental Concepts (continued)</b> Ladder Diagram Programmable Logic Controller PLC Electric Motors DC Motors AC Motors Motor Specifications Motor Failures		
<b>Chapter 18 – Re-configuring an Electrical Panel</b> Reconfiguring an Electrical Panel Pt. 1 Reconfiguring an Electrical Panel Pt. 2 Reconfiguring an Electrical Panel Pt. 3 Reconfiguring an Electrical Panel Pt. 4 Summary		
<b>Chapter 19 – Installing an Extra Outlet</b> Installing an Extra Outlet Pt. 1 Installing an Extra Outlet Pt. 2 Installing an Outlet Along the Baseboard Installing a GFCI Receptacle		
<b>Chapter 20 – Electrical Maintenance and Troubleshooting</b> Electrical Maintenance and Troubleshooting Example 1 – Open Circuit Example 2 – 3-Way Light Circuit Example 3 – 4-Way Light Circuit Pt. 1 Example 3 – 4-Way Light Circuit Pt. 2 Example 4 – GFCI Outlets Using Ohms Law to Troubleshoot More Tips Common Failure Modes Making Repairs		



## Electrical Course Lesson Plan (continued)

Watch all video instruction for the following segments:	✓ In Progress	✓ Completed
<b>Chapter 21 – Review and Summary</b> Electrical – Review and Course Summary <i>Electrical Course Test</i>		