

# *Wallenpaupack Area School District*

## **COURSE: Residential Electrical Wiring**

**GRADE LEVEL:** 10, 11, 12

**LENGTH OF COURSE:** Wiring 90 days.

**TEXT:** Modern Residential Wiring

**PUBLISHER:** Goodheart-Willcox Company, Inc.

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### **COURSE DESCRIPTION:**

This course is designed for the student who is interested in working with electrical wiring. The student can expect to learn residential wiring from the entrance panel to the finish cover plate on the switches and receptacles, and everything in between. An electrician repairs, maintains, and installs electrical systems and equipment, such as switches, receptacles, and transformers. Locates and determines electrical malfunctions, using test instruments, such as volt meter, continuity tester, and test lamp. Repairs malfunction by such methods as replacing burnt-out elements, fuses, switches, receptacles, or replacing defective wiring using hand tools. Test electrical equipment, such as heaters, for safety and efficiency, using standard test equipment. Installs fixtures and other electrical equipment and makes adjustments. Inspects circuits and wiring for specified shielding and grounding and repairs systems according to building codes and safety regulations. May plan layout and wire new installations. May be required to hold license.

### **CURRICULUM WRITING TEAM:**

Edward Wargo  
Kevin McCue

**DATE OF REVISION:** 2007

**Building Construction Occupations  
Statement of Course Philosophy for Secondary Education**

The course in Residential Electrical Wiring will serve the needs of students who plan on entering the construction industry as apprentices or learners and those who can become better citizens in the community with the benefit of knowledge in the Building Trades. This course will offer an opportunity for students to develop skills, knowledge and attitudes most desirable for entering the construction industry.

Special emphasis will be placed on the development of good attitudes in employer-employee as well as fellow worker relationships, safety and a feeling for the dignity of work.

Through course arrangement and scheduling, students will be afforded an opportunity to progress at the rate at which they are most capable.

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**PA Standards:** 13.1  
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13.4

<b>Topics:</b>	<b>Skills:</b>
<p>Wiring: 120V</p> <ul style="list-style-type: none"> <li>• Tools and materials               <ul style="list-style-type: none"> <li>○ Hand and power</li> <li>○ 2wire</li> <li>○ 3wire</li> <li>○ outlet boxes</li> </ul> </li> <li>• Receptacles               <ul style="list-style-type: none"> <li>○ Constantly hot</li> <li>○ Split</li> </ul> </li> <li>• Switches               <ul style="list-style-type: none"> <li>○ Single pole</li> <li>○ Dimmer</li> <li>○ Three way</li> <li>○ Four way</li> </ul> </li> <li>• Luminaries               <ul style="list-style-type: none"> <li>○ Porcelain</li> <li>○ Incandescent</li> <li>○ Fluorescent</li> <li>○ Fan/light combinations</li> </ul> </li> <li>• Door chimes               <ul style="list-style-type: none"> <li>○ Bell</li> <li>○ Buzzer</li> </ul> </li> <li>• Special 120V outlets</li> <li>• 35 120V wiring Schematics</li> </ul>	<p>Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area</p>
<b>Activities:</b>	<b>Performance Assessments:</b>
<p>Lecture Demonstrations Perform specified competencies in Electric Shop</p>	<p>Class Participation Class Attendance Shop Assessment               <ul style="list-style-type: none"> <li>• Objective</li> <li>• Subjective</li> </ul>               Written Tests Skill Demonstration Tests</p>

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<b>Topics:</b>	<b>Skills:</b>
Residential Wiring 240V <ul style="list-style-type: none"> <li>• Range receptacle 50 amp</li> <li>• Dryer receptacle 30 amp</li> <li>• Electrical/water heater 30 amp</li> <li>• Electrical/water heater timer</li> <li>• Baseboard heat 20 amp               <ul style="list-style-type: none"> <li>○ In-line thermostat</li> <li>○ Wall unit thermostat</li> </ul> </li> </ul>	Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area
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<b>Topics:</b>	<b>Skills:</b>
Distribution Panel <ul style="list-style-type: none"> <li>• Breakers</li> <li>• Grounding               <ul style="list-style-type: none"> <li>○ Ground rods</li> </ul> </li> <li>• Meter box</li> <li>• Entrance cable               <ul style="list-style-type: none"> <li>○ Overhead entrance</li> <li>○ Underground entrance</li> </ul> </li> <li>• Service connectors</li> <li>• Inspection</li> </ul>	Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area
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<b>Topics:</b>	<b>Skills:</b>
<p>Rough and Finish Wiring</p> <ul style="list-style-type: none"> <li>• Branch Circuits               <ul style="list-style-type: none"> <li>○ General split</li> <li>○ Individual</li> </ul> </li> <li>• Layout               <ul style="list-style-type: none"> <li>○ Symbols</li> <li>○ Specifications</li> <li>○ Working drawings</li> </ul> </li> <li>• Mounting boxes               <ul style="list-style-type: none"> <li>○ Plastic</li> <li>○ Metal</li> <li>○ Box depth gauge</li> </ul> </li> <li>• Drill holes               <ul style="list-style-type: none"> <li>○ Auger</li> <li>○ Speed bore</li> </ul> </li> <li>• Pull cable</li> <li>• Anchor cable</li> <li>• Rough connections               <ul style="list-style-type: none"> <li>○ Ground wire</li> <li>○ Twist caps</li> </ul> </li> <li>• Finish wire               <ul style="list-style-type: none"> <li>○ Install fixtures</li> <li>○ Cover plates</li> </ul> </li> </ul>	<p>Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area</p>
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<b>Topics:</b>	<b>Skills:</b>
<p>Conduit</p> <ul style="list-style-type: none"> <li>• Cutting thin-wall and rigid</li> <li>• Threading rigid               <ul style="list-style-type: none"> <li>○ Hand threading</li> <li>○ Machine threading</li> </ul> </li> <li>• Bending               <ul style="list-style-type: none"> <li>○ Offset</li> <li>○ Exact 90 degree stub</li> <li>○ Kick</li> </ul> </li> <li>• Installing connectors               <ul style="list-style-type: none"> <li>○ Compression</li> <li>○ Set screw</li> </ul> </li> <li>• Running materials               <ul style="list-style-type: none"> <li>○ Crawl space</li> <li>○ Basement</li> <li>○ Garage</li> </ul> </li> </ul>	<p>Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area</p>
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Electric Water Heater <ul style="list-style-type: none"><li>• Test tank elements using a volt meter</li><li>• Replace heating element</li><li>• Replace thermostat</li><li>• Disassemble tank and re-build using wiring schematic</li></ul>	Students will perform all of the assigned tasks in the classroom and demonstrate an acceptable skill level in the shop area
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