

**GREAT PLAINS TECHNOLOGY CENTER
COURSE OF STUDY**

Career Cluster: Architecture and Construction (AC)

Career Pathway: Construction (AC003)

Career Major: Electrical Level I (AC0030006)

Career Major Hours: Secondary Students: 1050 Hours
Adult Students: 1050 Hours

Instructor: Name: Mike Klein
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Academic Credit: Secondary Students: 3 high school credits per year
Adult Students: Transcript

Prerequisites: None

Career Major Description:

This career major will introduce students to the safety practices, use of hand and power tools/equipment and electrical theory related to the electrical industry.

Career Major Goals:

Students enrolled in this career major will be given the opportunity to develop the skills and attitude needed to successfully enter the electrical field

Related Career Opportunities:

- Entry Level Electrician's Assistant

Career Major Objectives:

Upon successful completion of this career major, the student should be able to:

- Demonstrate knowledge of basic electrical theory as it applies to residential wiring.
- Use test instruments to test and troubleshoot electrical circuits.
- Apply fabrication skills to construct and install wiring circuitry.
- Demonstrate proper use of various residential wiring tools.
- Properly wire residential circuits per N.E.C. specifications.
- Rewire/add new electrical circuits to existing dwellings per N.E.C. specifications.
- Troubleshoot and repair faulty electrical circuits.
- Complete a cost - estimate for a given job.
- Demonstrate proper job applications procedures.

Career Major Course Sequence:

- HS Student and Part-time Adult (Year One): Course Sequence I
- HS Student and Part-time Adult (Year Two): Course Sequence II
- Full-time Adult (Year One): Course Sequence I and II

**DESCRIPTION OF COURSES
SEQUENCE I**

<u>Course #</u>	<u>Course Name</u>	<u>HST</u>	<u>HSL</u>	<u>ADT</u>	<u>ADL</u>
TI01926	Electrical Core	130	0	130	0
<p>This course provides an overview of the electrical trade and discusses the career paths available to electricians. The instruction covers safety rules and regulations for electricians. The course will also discuss the necessary precautions to take for various electrical hazardous found on the job. The course covers the OSHA-mandated lockout/tagout procedure. A teacher led material recognition study will be a component of this course.</p>					
TI00203	Electrical Theory	60	0	60	0
<p>The course introduces the student to series, parallel, and series-parallel circuits. Resistive circuits, Kirchoff's voltage and current laws, and circuit analysis is covered. This course focuses on forces that are characteristic of alternating-current systems and the application of Ohm's law to AC circuits.</p>					
TI01938	Electrical Wiring Methods I	23	47	23	47
<p>In this course, the student will learn the various wiring methods used in different types of residential structures. The areas covered include electrical circuits, electrical test equipment, and grounding and bonding. The students will learn the theories and laws required when using circuits. Students will learn to use electrical test equipment in a safe manner and discover the purposes of grounding and bonding electrical systems.</p>					
TI01941	Electrical Wiring Methods II	23	47	23	47
<p>In this course, the student will learn the various wiring methods used in different types of occupancies and structure. The student will learn to use electrical Construction drawings, prints and symbols. The course focuses on the types and applications of conductors and covers wiring techniques. The instructor will stress the appropriate NEC requirements. This will allow trainees to practice making service calculations using the NEC requirements.</p>					
TI014GP	National Electrical Code I	20	40	20	40
<p>This course prepares the student to locate and interpret specific standards in the NFPA National Electrical Code. Instruction includes load calculations, conductor sizing, conduit fill calculations, and standards for wiring practices.</p>					
TI01707	Electrical Wiring Installations	40	80	40	80
<p>During this course, the student will learn the various wiring methods used in different types of structures. The wiring methods include hardware and systems used to mount and support boxes, receptacles, and other electrical components. It covers an introduction to conduit bending and installation. The course will include techniques for using hand operated and step conduit benders, as well as cutting, reaming, and threading conduit. Driven by NEC, the course discusses the selection and size of pull boxes, junction boxes, and handholds. The student will focus on the handling and installation of various types of lamps and lighting fixtures.</p>					
TI013GP	Practical Experience I	0	15	0	15
<p>Students work at a job site location to reinforce occupational skills as well as employability skills. The purpose of this experience is not only to assist students in fine-tuning their skills, but also to provide students with on the-job-training opportunities directly related to their career goal. This internship</p>					

experience will help bridge the gap between school and work. Students will also have the opportunity to participate in contests and live projects.

Sequence I Subtotal Hours:	Theory	Lab	Total
Secondary Student:	296	229	525
Adult Student:	296	229	525

**DESCRIPTION OF COURSES
SEQUENCE II**

<u>Course #</u>	<u>Course Name</u>	<u>HST</u>	<u>HSL</u>	<u>ADT</u>	<u>ADL</u>
TI01943	Electrical Wiring Methods III	23	47	23	47
<p>In this course, the student will learn advanced wiring methods used in residential structures. The course focuses on electrical prints, drawings, and symbols. The instruction teaches the types of information that can be found on schematics, one-lines, and wiring diagrams. NEC requirements are stressed during proper wiring techniques. The instruction allows trainees practice making service calculations. The curriculum explains how to calculate branch circuit and feeder loads for various structures.</p>					
TI015GP	National Electrical Code II	20	40	20	40
<p>This course prepares the student to locate and interpret specific standards in the NFPA National Electrical Code. Instruction includes load calculations, conductor sizing, conduit fill calculations, and standards for wiring practices.</p>					
TI01946	Electrical Wiring Methods IV	30	60	30	60
<p>During this course, the student will learn the advanced wiring methods used in different types of structures. The wiring methods include hardware and systems used to mount and support boxes, receptacles, and other electrical components. It covers all types of bending in all sizes of conduit up to 2 inches. The instruction focuses on mechanical, hydraulic, and electrical benders. Driven by NEC, the course discusses the selection and size of pull boxes, junction boxes, and handholds.</p>					
TI002GP	Electrical Lighting	15	25	15	25
<p>This course introduces the basic principles of human vision and the characteristics of light. It focuses on handling and installation of various types of lamps and lighting fixtures. The course covers specific types of incandescent, fluorescent, and HID lamps, as well as ballasts, troubleshooting, and various types of lighting controls.</p>					
TI00164	Motor Theory and Operation	10	20	10	20
<p>This course covers AC and DC motors, including the main components, circuits, and connections.</p>					
TI003GP	Overcurrent Protection	35	65	35	65
<p>This describes fuses and circuit breakers along with their practical applications. The course explains how to size and select circuit breakers and fuses for various applications. It also covers short circuit calculations and troubleshooting. Trainer Panels and the Project House Electrical Load are used.</p>					
TI004GP	Conductor Terminations and Splices	5	15	5	15
<p>This course describes methods of terminating and splicing conductors of all sizes, including preparing and taping conductors.</p>					

TI00007 Practical Experience II 0 85 0 85

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TI00802 Workforce Staging 0 30 0 30

This course is an integrated component within the courses taken by the individual student. The course is for the development of leadership, personal development and employability.

Sequence II Subtotal Hours:	Theory	Lab	Total
Secondary Student:	138	387	525
Adult Student:	138	387	525

Career Major Total:	Theory	Lab	Total
Secondary Student:*	434	616	1050
Adult Student:	434	616	1050

* High school students may complete this career major in an adult enrollment status if necessary. Please see your instructor or counselor for details.

Evaluation Policy:

Employability Grades (100 points per week; 30% of final grade)

The employability skills grade is based on 20 points per day (which may include: attitude, attendance, safety, punctuality, cooperation, participation, clean-up, class preparation, school/classroom rules, and time management). Points will be deducted if these responsibilities are not met at the instructor's discretion. Students will be allowed to make up unearned employability points for **excused** absences only. Full credit will be given for assignments/tests that have been made up due to excused absences only (see Student Handbook).

Performance Grades (35% of final grade)

- Live projects
- Performance or skill tests
- Homework
- Written Assignments

Test Grades (35% of final grade)

- Test grades will be based on a 100-point scale.
- Test grades include written and/or skills tests.
- A test will be given for each unit of instruction.
- Tests are to be taken as a unit is completed.
- Tests must be completed within allotted time.

Final Grade (9 Weeks Period)

9-weeks grade will be calculated by averaging grades in each category and summing each category according to their assigned weight. Progress reports will be sent to home schools at

six and twelve-week intervals each semester as required or requested. Grades are accessible on-line at <http://sonisweb.greatplains.edu/studsect.cfm>

Grading Scale:

The grading scale as adopted by the Board of Education is as follows:

- A = 90 – 100
- B = 80 – 89
- C = 70 – 79
- D = 60 – 69
- F = Below 60
- W = Withdrawn
- I = Incomplete
- N = No Grade (Refer to Student Handbook)

Make-Up Work Policy:

All Make-Up Work Is The Responsibility Of The Student. Make-up work will be handled as specified in the Student Handbook. Please be sure to read and understand all student policies, especially make-up of assignments, tests and employability due to absences. Students should always arrange for any make-up work with the instructor as per the Student Handbook. Students should keep track of his or her progress and grades.

Attendance Policy:

For specific information related to attendance and tardiness refer to the Student Handbook. Students should keep a written record of their absences and tardiness.

Course Requirements and Expectations:

The general course requirements and expectations include:

- Teaching methods consist of lecture and “hands on” projects.
- The student must demonstrate the ability to apply safety to all aspects of the electrical field.
- It is recommended that the student meet with the teacher and their parents at least once per semester.
- All students must adhere to the policies and procedures in the GPTC Student Handbook.
- SkillsUSA is the student organization for the residential electrical field. This club offers an outstanding opportunity to develop leadership and social skills. Students are highly encouraged to participate.
- It is highly recommended that the student have purchased or attained the required tools and equipment for employment as an electrician's assistant. Possessing a valid driver's license will also benefit the student and is recommended.

Student Behavior Includes:

- Safety precautions prohibit the wearing of tank tops, sleeveless shirts and visible body piercings.
- The required class dress is a program t-shirt with jeans or shorts and work boots or shoes. T-shirts cost \$10.00 each and are paid for by the student.
- Students will also be expected to wear their student ID badge appropriately any time they are on campus. This includes break times.
- Student ID badges will not be altered in any way or be required to purchase a new one.
- Students will wear shoes that completely cover the feet.
- Students will wear clear safety glasses at all times while in the shop environment and may not be altered without specific permission of the instructor. Clear prescription glasses will be

permitted.

These rules are in addition to the Student Handbook. Students will be provided a wall-locker and lock to secure all items.

NOTE: For additional information or questions regarding the GPTC School policies and procedures, please refer to the Student Handbook and/or the Instructor.

Industry Alignments:

- National Center for Construction Education and Research (NCCER)
- Oklahoma Construction Industry Board (OCIB)

Certification Outcomes:

Tier 2 – Certifications Endorsed by Industry Organizations

- ODCTE: Construction Trainee (3001)

Tier 3 – Certifications Aligned with National Standards

- ODCTE: Commercial Industrial Electrician’s Assistant (3201)
- ODCTE: Residential Electrician’s Assistant (3202)

CIP Code and SOC Code Crosswalk:

- CIP Code – 46.0302
- SOC Code – 47-2111.00

Instructional Materials:

Students are required to purchase the following list of textbooks and/or supplemental reference materials. The prices listed are approximate and subject to change.

Textbooks:

Benfield, Jack. Benfield Conduit Bending Manual & Workbook (2 set). 2nd ed. 0-87288-510-0. Overland Park: Ec & M Books, 1993. (\$50.00)

Hart, George, and Sammie Hart. UGLY’S Electrical References. 4th ed. 978-1-4496-9077-9. MA: Jones & Bartlett Learning, 2014. (\$17.00)

National Center for Construction Education and Research (NCCER). Core Curriculum: Introductory Craft Skills, Trainee Guide. 4th ed. 013608637-3. Upper Saddle River: Pearson, 2009. (\$68.00)

National Center for Construction Education and Research (NCCER). Electrical Level 1 Trainee Guide. 8th ed. 978-0-13-3829594. Upper Saddle River: Pearson, 2014. (\$85.00)

National Center for Construction Education and Research (NCCER). Electrical Level 2 Trainee Guide. 8th ed. 0-13383065-9. Upper Saddle River: Pearson, 2014. (\$123.00)

National Center for Construction Education and Research (NCCER). Electrical Level 3 Trainee Guide. 8th ed. 0-13383082-9. Upper Saddle River: Pearson, 2014. (\$123.00)

National Electrical Code (NEC). National Fire Protection Association. 978-145590672-7. 2013. (\$93.00)

