

# **Luna Community College**

## **Electrical Wiring Curriculum Profile**

**2012-2015**

## Electrical Wiring Technology

### Certificate

The program prepares students with entry-level job skills as an electrical apprentice in residential and commercial wiring fields, under the supervision of a licensed Journeyman Electrician. Certain courses are offered for individuals who may want to update their present skills. Safety is covered in accordance with procedure and practices of each major component.

Completion of this certificate can be applied toward the Associate of Applied Science Degree in Vocational/Technical Studies.

### Institutional Proficiency Requirements

In addition to the courses listed below for this program of study, students must also complete institutional proficiencies of ENG095, MATH075 and READ095 that are outlined on page 77 of the LCC 2012-2015 Catalog to meet all graduation requirements.

Certificate Requirements -

Minimum of 30 Credit Hours

### Program Requirements

**(30 hours)**

EWRG100 Fundamentals of AC/DC Electricity	4 credits
EWRG102 Residential Electricity	4 credits
EWRG105 Photovoltaics Design	3 credits
EWRG107 Photovoltaics Maintenance and Operation	4 credits
EWRG200 Commercial Electricity	4 credits
EWRG201 AC/DC Motor Control	3 credits
VOC109 Fundamentals of Vocational Education	4 credits
VOC117 Blueprint Reading and Construction Math	4 credits

**EWRG100: Fundamentals of AC/DC Electricity (4 credits)**

Orientation, safety, introduction to direct current, and AC circuits, electron theory, Ohms Law voltage, resistance, and power. Series and parallel circuits, practical applications in theories introduced are covered. Corequisite: VOC109.

Learning Outcomes:

- The student will demonstrate the fundamentals of safety with AC/DC electricity.
- The student will describe direct current, AC circuits and electron theory.
- The student will describe Ohm's Law voltage, resistance and power.
- The student will identify series and parallel circuits.

**EWRG102: Residential Electricity (4 credits)**

Theoretical and practical applications include residential code, safety wiring methods, circuit design, circuit components, tools, installation, planning and estimating, blueprint reading, appliance and special outlets, farm wiring, mobile home, low voltage, remodeling, troubleshooting, motors, and motor circuits. Prerequisite: EWRG100.

Learning Outcomes:

- The student will describe residential code.
- The student will demonstrate safe wiring methods, installation, circuit design and circuit components.
- The student will identify tools, appliances, special outlets, motors and motor circuits.
- The student will describe blueprint readings, planning and estimation.
- The student will demonstrate troubleshooting, farm wiring, and remodeling.

**EWRG105: Photovoltaics Design (3 credits)**

Photovoltaics course is designed to produce a student with the necessary technical skills to size and install and maintain a photovoltaic system. The student will understand the recommended design practices for stand-alone PV systems. System level trade-offs necessary for any photovoltaic system will be discussed. A system sizing method will be presented. Instructions and blank worksheets are provided. Fifteen specific examples for PV systems designed to meet a wide range of applications are presented. Includes sizing, design, hardware specifications, installations description, and cost information.

Learning Outcomes:

- The student will demonstrate the installation and maintenance of a photovoltaic system.
- The student will describe design practices for stand-alone PV systems.
- The student will identify sizes, design, hardware specifications, installation descriptions and cost information for PV systems.
- The student will describe specific examples of PV systems design to meet a wide range of applications.

**EWRG107: Photovoltaics Maintenance and Operation (4 credits)**

This course is a continuation of the EWRG105 Photovoltaics. This course covers service issues for stand-alone photovoltaic systems. Photovoltaic cells, modules and arrays, as well as balance of system components, such as batteries, voltage regulators, inverters and associated wiring, are included. Operation, inspection, troubleshooting, repair, and maintenance are covered. This course also includes work on a photovoltaic class project. Prerequisite: EWRG105.

## Learning Outcomes:

- The student will demonstrate service issues for stand-alone photovoltaic systems.
- The student will describe photovoltaic cells, modules and arrays, and balance systems.
- The student will demonstrate the operation, inspection, troubleshooting, repair and maintenance of photovoltaic.

**EWRG200: Commercial Electricity (4 credits)**

Covers commercial building plans and specifications, electric service, reading electrical drawings, branch circuits and feeders, low voltage remote control lighting, switches and receptacles, appliance circuits, cooling systems, other types of wiring methods, special circuits, emergency power systems, over-current protection, and panel board selection and installation. Practical wiring applications are covered. Prerequisite: EWRG100.

## Learning Outcomes:

- The student will describe commercial building plans, specifications, electric service, and electrical drawings.
- The student will identify branch circuits and feeders, switches and receptacles, appliance circuits, and cooling systems.
- The student will describe low voltage remote control lighting, other types of wiring methods, special circuits, emergency power systems, over-current protection and panel board selection and installation.

**EWRG201: AC/DC Motor Control (3 credits)**

Course uses a solid-motor control board to familiarize the student with industrial power supplies, DC motors, DC generators, series and shunt control, digital control and troubleshooting. Second part of the course is designed to familiarize the student with industrial measurement and control. Prerequisite: EWRG100.

## Learning Outcomes:

- Using a solid-motor control board, the student will demonstrate industrial power supplies, DC motors, DC generators, series and shunt control, digital controls and troubleshooting.
- The student will describe industrial measurements and controls.

### **VOC109: Fundamentals of Vocational Education (4 credits)**

This course provides a complete introduction into the construction trades, following National Center for Construction Education and Research (NCCER) curriculum guidelines. Several topics include: basic safety, introduction to construction math, hand tools, power tools, construction drawing, basic rigging, communication skills, employability skills and materials handling.

#### Learning Outcomes

- Identify the role of OSHA in job-site safety
- Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them
- Recognize and identify some of the basic hand and power tools used in construction industry, and demonstrate their proper uses.
- Identify and recognize basic construction drawing terms, components, and symbols.
- Identify and describe the use of slings and common rigging hardware, and demonstrate proper use of American National Standards Institute (ANSI) hand signals.
- Demonstrate critical communication skills, thinking skills, and the ability to solve problems using those skills.
- Identify and choose appropriate materials-handling techniques.

### **VOC117 Blueprint Reading and Construction Math (4 credits)**

This course will cover site layout, zoning rules and regulations in preparing a building site according to specifications. Course will be incorporating construction math for a variety of construction uses. Students will interpret and implement architectural drawings, following state and local codes.

#### Learning Outcomes

- Identify and describe what various sections are included in a set of construction drawings
- Demonstrate the ability to calculate areas and volumes of objects
- Describe and demonstrate the ability to make measurements using an architect's scale and an engineer's scale.
- Identify and describe what is included in a set of specifications, and explain why they are needed.
- Describe the fundamentals of green building, and identify the variety of basic materials used in this type of construction.
- Identify and understand the symbols, notations, abbreviations, and schedules associated with construction drawings.
- Demonstrate the ability to work with drawings to obtain information on dimensions, finishes, details, area calculations, in order to make material estimates.

## **Assessment**

Luna Community College defines assessment as a process that will lead to the improvement of student learning. The process must follow four steps as illustrated below.

### **LCC Assessment Plan**

All course offerings, including degree and certificate programs, at Luna Community College are required to follow the four-step assessment process. They include:

1. A list of expected learning outcomes
2. Assessment tools that directly measure those learning outcomes
3. The results of the data, and
4. How the data will be used to improve student learning

Academic Departments at Luna Community College are required to participate in semester “Improving Student Learning” assessment reporting and Student Learning Outcomes Assessment (SLOA) Committee presentations. Every semester, academic departments focus on specific learning outcomes with a targeted student population. Faculty are selected to participate in SLOA; selected faculty participate in developing assessment methods and procedures for their particular course or courses. The faculty give oral presentations at the end of the semester and information gathered is disseminated among SLOA members, faculty and staff. The purpose is to provide a baseline for future improvements.

Visit our web site at [www.luna.edu](http://www.luna.edu) to review LCC’s Improving Student Learning (ISL) reports. LCC also abides by the New Mexico state competencies for general education. 22



**LUNA COMMUNITY COLLEGE**  
**Standard “Minimal” Requirements for Course Syllabus**

<b>Course</b>	course title and other course information including meeting times, dates, room number, credits, semester, prerequisites and/or co-requisites
<b>Faculty</b>	information about the instructor and his or her contact information (e.g., phone number and email). List time and day of office hours for full time faculty
<b>Course Description</b>	use catalog description
<b>Expectations of Students</b>	What do you expect from your students? For example, description of students' responsibilities in the learning process; how you hope the students will approach the course subject/content; take responsibility for their learning; the amount of study time expected in the course, and suggestions on how to succeed in the course.
<b>Course Learning Outcomes (Competencies)</b>	this section will include a list of skills or techniques students will develop from the course. This list will consist of a <u>minimum of four to six quantifiable statements</u> about what students will be able to do after completing the course.
<b>New Mexico CORE Competencies</b>	If teaching a CORE course, the State HED competencies must be stated (e.g., Communications, Mathematics, Laboratory Science, Social & Behavioral Sciences, Humanities & Fine Arts).
<b>Methods of Measuring Learning Outcomes (Competencies)</b>	What tools are used to measure student success based on the learning outcomes?

**Evaluation**

Indicate how the student will earn a particular grade, such as information about assignments including types of assignments, nature of exams (e.g., take home, open book, in-class) due dates, grading criteria and so forth.

**Course Schedule**

Add a tentative schedule indicating the course content that will be covered throughout the course (e.g., eight week or sixteen week schedule).

**Policies**

Include policies such as attendance, academic responsibilities, late assignments, missed exams, cell phones, etc.

Add a statement that indicates: for additional student information, refer to the 2012-2015 Student Handbook

**Grading Standard**

Refer to page 37 of the LCC 2012-2015 Catalog

**Textbook(s)**

Name of required textbooks(s) and any recommended materials. Include ISBN number(s)

**Important Dates**

List important dates such as last day to withdraw from the course, holidays, add/drop, midterm, final exam week, spring break and other important dates.

**ADA Statement**

Add a statement regarding accommodations for students with disabilities

**Syllabus Revisions or Changes**

Add a statement that indicates the syllabus is subject to change

**Internet Courses (non-proctored)**

Use the following statement: LCC will ensure firm student identification for examinations through the use of username and password for non proctored exams. As an on-line student, you are responsible for keeping your username and password secure. Your username and password should not be given out as you are responsible for



all assessment, assignments, and on-line communications. Any academic dishonesty/plagiarism will not be tolerated and is grounds for disciplinary actions. [Please refer to page 6 of the LCC 2012-2015 Catalog]