

**ELECTRICITY 1, 2, 3, 4**  
**COURSE CODE: 6287, 6288, 6289, 6290**  
**STUDENT PROFILE**

<b>STUDENT'S NAME:</b>	<b>TEACHER'S NAME:</b>
<b>School Year/Semester:</b>	<b>Date Begin:</b>
<b>Grade:</b>	<b>Date Completed:</b>

**Directions:** Document student's progress using the applicable rating scales below: Enter date of completion under the appropriate column.

- 0 - Has not received instruction in this area / **no experience or knowledge of this task (N/A)**
- 1 – Can apply and perform **independently (80-100)**
- 2 – Can perform the task completely with **limited supervision (70-79)**
- 3 – Requires additional instruction and or **close supervision (60-69)**

<b>A. STUDENT ORGANIZATIONS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the purpose and goals of a Career and Technology Student Organization (CTSO).				
2	Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.				
3	Explain the benefits and responsibilities of being a member of a CTSO.				
4	List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.				
5	Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.				
<b>B. TECHNOLOGY KNOWLEDGE</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation				
2	Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.				
3	Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.				
4	Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyber bullying; piracy; illegal downloading; cyberbullying; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).				
5	Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, Creative Commons, documents, video, sounds, music, trademarks, and other elements for personal use.				

6	Describe ethical and legal practices of safeguarding the confidentiality of business-related information.				
7	Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.				
<b>C. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Demonstrate punctuality.				
2	Demonstrate self-representation.				
3	Demonstrate work ethic.				
4	Demonstrate respect.				
5	Demonstrate time management.				
6	Demonstrate integrity.				
7	Demonstrate leadership.				
8	Demonstrate teamwork and collaboration.				
9	Demonstrate conflict resolution.				
10	Demonstrate perseverance.				
11	Demonstrate commitment.				
12	Demonstrate a healthy view of competition				
13	Demonstrate a global perspective.				
14	Demonstrate health and fitness.				
15	Demonstrate self-direction.				
16	Demonstrate lifelong learning.				
<b>D. PROFESSIONAL KNOWLEDGE</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Demonstrate effective speaking and listening skills.				
2	Demonstrate effective reading and writing skills.				
3	Demonstrate mathematical reasoning.				
4	Demonstrate job-specific mathematics skills.				
5	Demonstrate critical-thinking and problem-solving skills.				
6	Demonstrate creativity and resourcefulness.				
7	Demonstrate an understanding of business ethics.				
8	Demonstrate confidentiality.				
9	Demonstrate an understanding of workplace structures, organizations, systems, and climates.				

10	Demonstrate diversity awareness.				
11	Demonstrate job acquisition and advancement skills.				
12	Demonstrate task management skills.				
13	Demonstrate customer-service skills.				
<b>E. NCCER® CONTREN CORE MODULES</b>					
<b>MODULE A: SAFETY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the responsibilities and personal characteristics of a professional craftsperson.				
2	Describe the safe work requirements for elevated work.				
3	Identify and explain how to avoid struck-by and caught-in-between hazards.				
4	Explain the appropriate safety precautions around common job-site hazards.				
5	Demonstrate the use and care of appropriate personal protective equipment (PPE).				
6	Identify and describe other specific job-site safety hazards.				
7	Follow safe procedures for lifting heavy objects.				
8	Describe safe behavior on and around ladders and scaffolds.				
9	Explain the importance of the Hazard Communication Standard (HazCom) requirement and Safety Data Sheets (SDS)				
10	Describe fire prevention and firefighting techniques.				
11	Define safe work procedures around electrical hazards.				
12	Complete 10-hour OSHA course/assessment and receive card. (SDE Requirement)				
13	Complete Performance Tasks				
<b>MODULE B: CONSTRUCTION MATH</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Add, subtract, multiply, and divide whole numbers, with and without a calculator.				
2	Use a standard ruler and a metric ruler to measure.				
3	Add, subtract, multiply, and divide fractions.				
4	Add, subtract, multiply, and divide decimals, with and without a calculator.				
5	Convert decimals to percent and percent to decimals.				
6	Convert fractions to decimals and decimals to fractions.				
7	Explain what the metric system is and how it is important in the construction trade.				

8	Recognize and use metric units of length, weight, volume, and temperature.				
9	Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.				
<b>MODULE C: INTRODUCTION TO HAND TOOLS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Recognize and identify various types of basic hand tools used in the construction trade.				
2	Identify and describe how to use various types of measurement and layout tools.				
3	Identify and explain how to use various types of cutting and shaping tools.				
4	Use these tools safely.				
5	Describe the basic procedures for taking care of these tools.				
6	Complete Performance Tasks				
<b>MODULE D: INTRODUCTION TO POWER TOOLS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify and explain how to use various types of power drills and impact wrenches used in the construction trade.				
2	Identify and explain how to use various types of power saws.				
3	Identify and explain how to use various grinders and grinder attachments.				
4	Identify and explain how to use miscellaneous power tools.				
5	Use power tools safely.				
6	Explain how to maintain power tools properly.				
7	Complete Performance Tasks				
<b>MODULE E: INTRODUCTION TO CONSTRUCTION DRAWINGS/RECOMMEND BLUEPRINT READING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify and describe various types of construction drawings, including their fundamental components and features.				
2	Recognize and identify basic blueprint terms, components, and symbols.				
3	Relate information on blueprints to actual locations on the print.				
4	Recognize different classifications of drawings.				
5	Interpret and use drawing dimensions.				
6	Complete Performance Tasks				
<b>MODULE F: BASIC RIGGING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>

1	Explain how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site.				
2	Describe inspection techniques and load-handling safety practices.				
3	Explain the American National Standards Institute (ANSI) hand signals.				
4	Complete Performance Tasks				
<b>MODULE G: BASIC COMMUNICATION SKILLS (SDE REQUIREMENT)</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the communication, listening and speaking processes and their relationship to job performance.				
2	Describe good reading and writing skills and their relationship to job performance				
3	Demonstrate telephone and e-communication skills necessary in the workplace.				
4	Complete Performance Tasks				
<b>MODULE H: BASIC EMPLOYABILITY SKILLS (SDE Requirement)</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the opportunities in the construction business and how an individual enters the construction workforce.				
2	Explain the importance of critical thinking and how to solve problems in the workplace.				
3	Explain the importance of social skills and identify ways good social skills are applied in the construction trade.				
4	Describe computer systems and their industry applications.				
5	Explain interpersonal relationship skills, self-presentation, and key workplace issues such as sexual harassment, stress, and substance abuse.				
<b>MODULE I: MATERIALS HANDLING (OPTIONAL)</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the hazards associated with handling materials and provides techniques to avoid both injury and property damage.				
<b>ELECTRICITY 1 – 4 LEVEL 1 F. ORIENTATION TO ELECTRICAL TRADE</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify various career paths and opportunities in the electrical trade.				
2	Identify the skills, responsibilities, and characteristics needed to be a successful electrician.				
3	Describe various types of training in the electrical field.				
4	List department of labor (DOL) requirements for apprenticeship.				

5	Describe the typical components in a residential, commercial, and industrial wiring system.				
6	Identify employee and employer responsibilities.				
<b>G. ELECTRICAL SAFETY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Analyze the effects of electrical shock on the human body.				
2	Verify that circuits are de-energized.				
3	Use PPE to reduce the risk of injury.				
4	Identify OSHA requirements for protective equipment.				
5	Apply OSHA requirements in the workplace.				
6	Select and use protective equipment.				
7	Discuss the purpose of NFPA 70E®.				
8	Identify the safety hazards associated with ladders, scaffolds, and lift equipment.				
9	Avoid back injuries by practicing proper lifting techniques.				
10	Demonstrate basic tool safety.				
11	Identify confined-space entry procedures.				
12	Work safely with dangerous materials.				
13	Select and use appropriate fall protection.				
14	Demonstrate performance tasks				
<b>H. INTRODUCTION TO ELECTRICAL CIRCUITS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify and describe hand tools commonly used by electrical workers.				
2	Identify the components of an atom.				
3	Compare the atomic structures of conductors and insulators.				
4	Identify the role of magnetism in electrical devices.				
5	Identify the basic components in a power distribution system.				
6	Define terms related to electricity, e.g., current, voltage, resistance.				
7	Use Ohm's law to solve for unknown circuit values.				
8	Identify the symbol for a resistor and determine its value based on color codes.				
9	Distinguish between series and parallel circuits.				

10	Identify the instruments used to measure circuit values.				
11	Calculate electrical power.				
12	Demonstrate performance tasks.				
<b>I. ELECTRICAL THEORY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify resistances in series and parallel.				
2	Simplify series-parallel circuits.				
3	Apply Ohm's law to various types of circuits.				
4	Apply Kirchhoff's laws to various types of circuits.				
5	Use Kirchhoff's current law.				
6	Use Kirchhoff's voltage law				
<b>J. INTRODUCTION TO NATIONAL ELECTRICAL CODE®</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Trace the history of the NEC®.				
2	Identify the roles of other organizations, e.g., UL, CSA.				
3	Identify the chapters in the NEC®.				
4	Use the NEC® to find specific installation requirements.				
5	Demonstrate performance tasks.				
<b>K. DEVICE BOXES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify, size, and install boxes and their applications.				
2	Size and install pull and junction boxes.				
3	Demonstrate performance tasks				
<b>L. HAND BENDING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Select and use hand bending equipment.				
2	Use geometry to make a bend.				
3	Make 90° bends.				
4	Make offset bends.				
5	Cut, ream, and thread conduit.				
6	Cut conduit using a hacksaw and a pipe cutter.				
7	Cut and join PVC conduit.				
8	Demonstrate performance tasks.				

<b>M. RACEWAYS AND FITTINGS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify types of conduit and their applications.				
2	Properly bond conduit for use as a ground path				
3	Install metal conduit fittings.				
4	Make conduit-to-box connections.				
5	Identify raceway supports.				
6	Identify installation requirements for various construction methods.				
7	Select and install tie wraps and screws.				
8	Select and install hammer-driven pins and studs.				
9	Identify the safety requirements for stud-type guns.				
10	Select and install masonry and hollow-wall anchors.				
11	Select and install epoxy anchoring systems.				
12	Identify types of wireways and their components.				
13	Install wireway supports.				
14	Identify and install specialty raceways.				
15	Identify cable tray types and fittings.				
16	Install cable tray supports.				
17	Handle and store raceways.				
18	Demonstrate performance tasks				
<b>N. CONDUCTORS AND CABLES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify wire sizes.				
2	Determine conductor ampacities.				
3	Identify conductor materials and insulation.				
4	Identify fixture wiring.				
5	Identify cable types and applications.				
6	Identify instrumentation control wiring.				
7	Install conductors using fish tape.				
8	Install conductors using pulling equipment.				
9	Demonstrate performance tasks.				



<b>O. BASIC ELECTRICAL CONSTRUCTION DRAWINGS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Read and interpret information found on site and floor plans.				
2	Read and interpret information found elevation and sectional drawings.				
3	Read and interpret information found on title blocks.				
4	Interpret drafting lines.				
5	Use an architect's scale.				
6	Use an engineer's scale.				
7	Use a metric scale.				
8	Interpret electrical symbols.				
9	Analyze a set of electrical drawings.				
10	Identify fixtures in a lighting floor plan.				
11	Read block and schematic diagrams.				
12	Interpret written specifications.				
13	Demonstrate performance tasks				
<b>P. RESIDENTIAL ELECTRICAL SERVICES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Calculate the electric service load.				
2	Apply demand factors.				
3	Calculate appliance loads.				
4	Size the load center.				
5	Size grounding electrodes and the main bonding jumper for residential electrical systems.				
6	Identify the service drop location and panelboard location of service-entrance equipment.				
7	Identify wiring methods for various types of residences.				
8	Select and install cable systems and raceways for various types of residences.				
9	Complete the branch circuit layout for power and lighting.				
10	Install outlet boxes.				
11	Select and install receptacles and switches.				
12	Install devices near residential swimming pools, spas, and hot tubs.				
13	Demonstrate performance tasks				

<b>Q. ELECTRICAL TEST EQUIPMENT</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the applications of a voltmeter, ohmmeter, ammeter, a multimeter, and other meters.				
2	Select a meter with the correct category rating for an application.				
3	Identify electrical test equipment safety hazards.				
4	Demonstrate performance tasks.				
<b>LEVEL 2 F. ALTERNATING CURRENT</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Define the terminology of sine waves.				
2	Define AC phase relationships.				
3	Identify nonsinusoidal waveforms.				
4	Find unknown values in purely resistive AC circuits.				
5	Find unknown values in inductive AC circuits.				
6	Find unknown values in capacitive AC circuits.				
7	Find unknown values in combination circuits.				
8	Make power calculations in AC circuits.				
9	Calculate true, apparent, and reactive power.				
10	Use the power triangle to determine unknown values.				
11	Identify the basic components in a transformer.				
12	Identify transformer operating characteristics.				
13	Calculate turns and voltage ratios.				
14	Identify various types of transformers and their applications				
<b>G. MOTORS: THEORY AND APPLICATION</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe how DC motors operate.				
2	Identify types of DC motors.				
3	Describe how AC motors operate.				
4	Identify three-phase, synchronous, and single-phase induction motors.				
5	Identify the various types of AC and DC motors and how they operate.				
6	Identify variable-speed drives and describe their operating characteristics.				

7	Identify braking methods.				
8	Identify motor enclosures, frame designations, and operating characteristics.				
9	Identify motor operating characteristics using nameplate data.				
10	Identify the connections and terminal markings for AC motors.				
11	Identify the NEC® requirements for motors.				
12	Identify NEC® installation and motor protection requirements.				
13	Demonstrate the ability to install and wire motors.				
14	Demonstrate performance tasks				
<b>H. ELECTRIC LIGHTING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Explain the relationship between human vision and light.				
2	Identify how the human eye operates.				
3	Identify the characteristics of light.				
4	Identify and install lamps.				
5	Identify and install ballasts.				
6	Identify lighting fixtures and their applications.				
7	Store and handle lamps and lighting fixtures.				
8	Install lighting fixtures.				
9	Select occupancy sensors.				
10	Select photosensors.				
11	Use lighting timers.				
12	Program energy management systems.				
13	Demonstrate performance tasks				
<b>I. CONDUIT BENDING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the NEC® requirements for conduit bends.				
2	Identify the minimum radius requirements for various types of conduit.				
3	Calculate the number of bends per run.				
4	Use right-angle mathematics to find bend distances.				
5	Use the circumference of a circle to determine bend distances.				

6	Chart a mechanical bender.				
7	Make mechanical bends.				
8	Use electric and hydraulic conduit benders.				
9	Install PVC conduit.				
10	Bend PVC conduit.				
11	Demonstrate performance tasks				
<b>J. PULL AND JUNCTION BOXES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Select pull and junction boxes.				
2	Select and install fittings.				
3	Size pull and junction boxes for systems over and under 1,000V.				
4	Identify conduit bodies and other cast enclosures.				
5	Select and install handholes.				
6	Demonstrate performance tasks				
<b>K. CONDUCTOR INSTALLATIONS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Plan the installation.				
2	Identify a pulling location and set up the cable reels.				
3	Prepare raceways for conductors.				
4	Install a pull line.				
5	Prepare the cable ends for pulling.				
6	Select cable-pulling equipment.				
7	Set up the feeding end.				
8	Support conductors.				
9	Pull cable in cable trays.				
10	Identify cable limitations when pulling.				
11	Calculate the allowable tension on pulling devices and conductors.				
12	Calculate the sidewall loading.				
13	Demonstrate performance tasks.				
<b>L. CABLE TRAY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Select cable tray fittings.				

2	Identify cable tray supports.				
3	Determine the load on supports.				
4	Identify types of failure under load.				
5	Identify installation requirements for cable tray.				
6	Determine the number of conductors allowed in cable tray operating at 2,000V or less.				
7	Identify de-rating factors for cable tray conductors.				
8	Demonstrate performance tasks.				
<b>M. CONDUCTOR TERMINATIONS AND SPLICES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Strip and train small and large conductors.				
2	Bend cable and train conductors.				
3	Make wire connections.				
4	Install various types of connectors.				
5	Make aluminum connections.				
6	Install control and signal cables.				
7	Reinsulate electrical connections.				
8	Tape electrical connections.				
9	Install heat-shrink insulators.				
10	Use motor connection kits.				
11	Demonstrate performance tasks				
<b>N. GROUNDING AND BONDING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the purpose of grounding and bonding.				
2	Identify the grounding requirements for various systems.				
3	Identify service grounding methods.				
4	Size and install a grounding electrode conductor.				
5	Select other electrodes.				
6	Size and select equipment grounding.				
7	Size an equipment grounding conductor.				
8	Ground an enclosure.				
9	Bond service equipment.				

10	Size the main bonding jumper.				
11	Bond multiple service disconnects.				
12	Bond enclosures and equipment.				
13	Ground and bond separately derived systems.				
14	Ground separately derived systems.				
15	Install grounding at more than one building.				
16	Test for effective grounds.				
17	Measure earth resistance using the fall-of- potential method.				
18	Complete a three-point test.				
19	Demonstrate performance tasks				
<b>O. CIRCUIT BREAKERS AND FUSES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the function of overcurrent protective devices.				
2	Identify types of overcurrent conditions.				
3	Identify NEC® requirements for overcurrent protective devices.				
4	Size and select circuit breakers.				
5	Identify circuit breaker components.				
6	Identify circuit breaker types and ratings.				
7	Size and select fuses.				
8	Identify fuse types and markings.				
9	Size fuses.				
10	Coordinate the operation of overcurrent protective devices.				
11	Demonstrate performance tasks.				
<b>P. CONTROL SYSTEMS AND FUNDAMENTAL CONCEPTS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify magnetic and mechanically held contactors.				
2	Select lighting contactors.				
3	Make forward and reverse motor contactor connections.				
4	Select mechanically held contactors.				
5	Select and troubleshoot relays.				

6	Select control relays.				
7	Select timers and timing relays.				
8	Select solid-state relays.				
9	Select overload relays.				
10	Install low-voltage remote control switching systems.				
11	Identify remote control switching system components and operating characteristics.				
12	Plan and install a remote control switching system.				
13	Demonstrate performance tasks				
<b>LEVEL 3</b>					
<b>F. CONSTRUCTION INSPECTION AND QUALITY CONTROL</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the standards and specifications that apply to masonry units, mortar, grout, and accessories.				
2	Describe the standards that apply to laboratory and field testing of masonry construction.				
3	Describe how to build sample panels.				
4	Describe how to build hollow and grouted masonry prisms.				
5	Describe how to prepare and test mortar and grout prisms.				
6	Describe how to conduct masonry tests.				
7	Describe how to perform sand tests.				
8	Describe how to perform mortar consistency tests.				
9	Describe how to perform brick absorption tests.				
10	Describe how to perform laboratory tests.				
11	Describe why and how standards and codes inspections are performed.				
12	Describe why and how materials inspections are performed.				
13	Describe the types of observations that are undertaken during construction.				
14	Describe why and how construction tolerances are monitored.				
15	Demonstrate performance tasks.				
<b>G. ELEVATED MASONRY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe safety precautions related to an elevated work area.				

2	Discuss fall protection related to elevated work areas.				
3	Describe how to properly brace a concrete masonry wall for wind.				
4	Describe how to properly brace a wall for backfill.				
5	List the construction sequence for elevated masonry systems.				
6	Describe how elevated masonry systems are designed.				
7	Identify common interior and exterior walls used for elevated masonry systems.				
8	Explain safety precautions and proper hand signals to be observed when working around cranes and material hoists.				
9	Explain safety precautions to be observed when moving and stocking materials.				
10	Explain safety precautions to be observed when working at elevated workstations.				
11	Explain how disposal chutes and waste bins are used when working from elevated workstations.				
12	Demonstrate performance tasks.				
<b>H. ESTIMATING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe how to use the coursing method for block.				
2	Describe the square-foot method for block.				
3	Explain how to estimate openings and lintels.				
4	Explain how to estimate mortar for single- and multi-wythe walls.				
5	Explain how to estimate grout.				
6	Explain the coursing method for brick.				
7	Explain the square-foot method for brick.				
8	Describe how to allow for openings in an estimate.				
9	Explain how to estimate mortar for brick.				
10	Explain how to estimate joint reinforcement.				
11	Explain how to estimate structural reinforcement.				
12	Explain how to estimate masonry ties.				
13	Explain how to estimate other masonry units.				
14	Explain how to estimate other masonry accessories.				



15	Demonstrate performance tasks.				
<b>I. SITE LAYOUT – DISTANCE MEASUREMENT AND LEVELING</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	List characteristics of contour lines.				
2	Describe layout control points.				
3	Explain how to convert between distance-measurement systems.				
4	Explain how to place control points and other markers.				
5	Describe how to communicate information on control points and other markers.				
6	Discuss how control markers are color coded.				
7	Explain how to use tapes.				
8	Explain how to use range poles.				
9	Explain how to use plumb bobs and gammon reels.				
10	Explain how to use hand sight levels.				
11	Explain how to estimate distances by pacing.				
12	Describe how to measure distances electronically.				
13	Identify leveling instruments.				
14	Describe the use of tripods and leveling rods.				
15	Explain how to set up and adjust leveling instruments.				
16	Explain how to test the calibration of leveling instruments.				
17	Define differential-leveling terminology.				
18	Explain the differential-leveling procedure.				
19	Explain how field notes are recorded and used.				
20	Explain how to transfer elevations up a structure.				
21	Explain profile, cross-section, and grid leveling.				
22	Explain how to construct batter boards.				
23	Describe how to use the 3-4-5 rule.				
24	Demonstrate performance tasks.				
<b>J. FUNDAMENTALS OF CREW LEADERSHIP</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the opportunities in the masonry industries.				

2	Describe how workers' values change over time.				
3	Explain the importance of training and safety for the leaders in the masonry industries.				
4	Describe how new technologies are beneficial to the masonry industries.				
5	Identify the gender and minority issues associated with a changing workforce.				
6	Describe what employers can do to prevent workplace discrimination.				
7	Differentiate between formal and informal organizations.				
8	Describe the difference between authority, responsibility, and accountability.				
9	Explain the purpose of job descriptions and what they should include.				
10	Distinguish between company policies and procedures.				
11	Describe the role of a crew leader.				
12	List the characteristics of effective leaders.				
13	Be able to discuss the importance of ethics in a supervisor's role.				
14	Identify the three styles of leadership.				
15	Describe the forms of communication.				
16	Describe the four parts of verbal communication.				
17	Describe the importance of active listening.				
18	Explain how to overcome the barriers to communication.				
19	List ways that leaders can motivate their employees.				
20	Explain the importance of delegating and implementing policies and procedures.				
21	Distinguish between problem solving and decision making.				
22	Explain the importance of safety.				
23	Give examples of direct and indirect costs of workplace accidents.				
24	Identify safety hazards of the construction industry.				
25	Explain the purpose of OSHA.				
26	Discuss OSHA inspection procedures.				
27	Identify the key points of a safety program.				

28	List steps to train employees on how to perform new tasks safely.				
29	Identify a crew leader's safety responsibilities.				
30	Explain the importance of having employees trained in first aid and cardiopulmonary resuscitation (CPR).				
31	Describe the indications of substance abuse.				
32	List the essential parts of an accident investigation.				
33	Describe ways to maintain employee interest in safety.				
34	Distinguish between company policies and procedures.				
35	Describe the three phases of a construction project.				
36	Define the three types of project delivery systems.				
37	Define planning and describe what it involves.				
38	Explain why it is important to plan.				
39	Describe the two major stages of planning.				
40	Explain the importance of documenting job site work.				
41	Describe the estimating process.				
42	Explain how schedules are developed and used.				
43	Identify the two most common schedules.				
44	Explain how the critical path method (CPM) of scheduling is used.				
45	Describe the different costs associated with building a job.				
46	Explain the crew leader's role in controlling costs.				
47	Illustrate how to control the main resources of a job: materials, tools, equipment, and labor.				
48	Explain the differences between production and productivity and the importance of each.				
49	Demonstrate performance tasks.				
<b>LEVEL 4 (ADVANCED ELECTRICITY)</b>					
<b>F. LOAD CALCULATIONS – FEEDERS AND SERVICES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Explain basic load calculations for residential and commercial including raceway fill, conductor de-rating, and voltage drop.				
<b>G. HEALTH CARE FACILITIES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>

1	Explain the installation of electrical systems in health care facilities, including the requirements for life safety and critical circuits.				
<b>H. STANDBY AND EMERGENCY SYSTEMS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Explain the NEC® installation requirements for electric generators and storage batteries.				
<b>I. BASIC ELECTRONIC THEORY</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Explain the function and operation of basic electronic devices, including semiconductors, diodes, rectifiers, and transistors.				
2	Demonstrate performance tasks.				
<b>J. FIRE ALARM SYSTEMS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Explain the technologies, codes, and wiring approaches used to assemble a fire alarm system.				
2	Explain installation and troubleshooting techniques.				
3	Demonstrate performance task				
<b>K. SPECIALTY TRANSFORMERS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify and describe various types of transformers.				
2	Identify instrument transformers.				
3	Define harmonics and explain how harmonic issues are identified and resolved.				
4	Demonstrate performance tasks				
<b>L. ADVANCED CONTROLS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the various types of relays used in motor control circuits.				
2	Explain how reduced-voltage starting is accomplished.				
3	Describe the types and uses of adjustable-frequency drives.				
4	Describe motor braking methods.				
5	Describe how to troubleshoot motor controls.				
6	Demonstrate performance tasks				
<b>M. HVAC CONTROLS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe the operating principles and major components of HVAC systems.				
2	Identify the types of thermostats and their uses.				
3	Identify and describe HVAC control systems and devices.				

4	Identify the NEC® requirements that apply to HVAC systems.				
5	Demonstrate performance tasks				
<b>N. HEAT TRACING AND FREEZE PROTECTION</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe heat-tracing applications, components, controls, and selection/installation considerations related to piping.				
2	Describe roof, gutter, and downspout de-icing systems and the relevant selection/installation considerations.				
3	Describe snow-melting and anti-icing systems and the relevant selection/installation considerations.				
4	Describe other electric heat-tracing and warming systems and the relevant selection/installation considerations.				
5	Demonstrate performance tasks.				
<b>O. MOTOR OPERATION AND MAINTENANCE</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify the factors that affect motor reliability and lifespan.				
2	Describe maintenance and troubleshooting requirements for electric motors.				
3	Describe the guidelines for installing and commissioning electric motors.				
<b>P. MEDIUM-VOLTAGE TERMINATIONS/SPLICES</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe how to splice medium-voltage cable.				
2	Describe termination classes and important considerations when creating terminations.				
3	Define high-potential testing and explain how such testing is conducted.				
4	Demonstrate performance tasks				
<b>Q. SPECIAL LOCATIONS</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Identify and select equipment, components, and wiring methods for various special locations and applications.				
2	Identify and select equipment, components, and wiring methods for marinas, boatyards, and bodies of water.				
3	Identify and select equipment, components, and wiring methods for pools, spas, tubs, and fountains.				
<b>R. FUNDAMENTALS OF CREW LEADERSHIP</b>		<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>
1	Describe current issues and organizational structures in industry today.				
2	Explain how to incorporate leadership skills into work habits, including communications, motivation, team-building, problem-solving, and decision-making skills.				
3	Identify a crew leader's typical safety responsibilities with respect to common safety issues, including awareness of safety regulations and the cost of accidents.				

4	Demonstrate a basic understanding of the planning process, scheduling, and cost and resource control.				
5	Demonstrate performance tasks				