

2023-2024

NWKTC Catalog and Student Handbook

ELECTRICAL TECHNOLOGY

Description: Electrical Technology provides instruction to develop basic electrician skills, technical knowledge, and related occupational information to prepare an individual for initial employment in the electrical trade. The program begins with the basic fundamentals of electricity and progresses through all types of residential, commercial, and industrial wiring, including the most advanced solid-state motor controls. Throughout the program, instruction will include class work, shop projects, and on-the-job service work.

Applied training will include off-campus service calls in motor control repairs, industrial maintenance, and new or existing commercial/residential wiring. Students also become familiar with various electrical systems through on-campus electrical maintenance.

Degree/Certificates awarded:

AAS

Tech Cert B, Tech Cert C

Accreditation/Certification:

This program prepares students to sit for the journeyman electrician exam.

Program Learning Outcomes:

Upon successful program completion, the student will be able to:

1. Demonstrate safety while working with electrical equipment.
 2. Analyze schematics and blueprints.
 3. Perform installation of electrical equipment and materials in residential, industrial, and commercial.
 4. Apply the theory of electrical technology to specific jobs using critical thinking/reasoning.
 5. Diagnose and install motor control centers.
 6. Utilize trouble-shooting techniques.
 7. Demonstrate knowledge of NEC.
- Demonstrate mathematical and reasoning skills.
 - Demonstrate effective reading, writing, speaking, listening, and time management skills.
 - Demonstrate basic computer skills.

Program Schedule:

Students attend class from 7:00 a.m. to 3:30 p.m., Monday through Thursday and 7:00 a.m. – 2:30 p.m. on Friday.

Miscellaneous Notes:

During the sophomore year students may participate in the Occupational Work Experience (OWE) as early as 8 weeks before the end of the program.

PROGRAM GUIDE

YEAR I: FIRST SEMESTER

Course #	Course Name	Credits
EL 100	OSHA 10	1
EL 132A	AC/DC Circuits I	4
EL 136	Instruments & Measurements	1
EL 139	Print Reading	2
EL 144A	Workplace Skills & Applied Practice I	3
EL 148A	National Electric Code I	4
MATH 105 or 107	Technical Math (or Math Elective)	3
SO 100	Student Success Seminar (Required)	1

YEAR I: SECOND SEMESTER

Course #	Course Name	Credits
CF 101	Computer Fundamentals	3
EL 103	Safety	2
EL 155	Residential Wiring I	4
EL 160	Motor Controls I	2
EL 170A	Troubleshooting Techniques I	3
EL 190A	National Electric Code II	4
EL 198A	Workplace Skills & Applied Practices II	3

YEAR II: FIRST SEMESTER

Course #	Course Name	Credits
BA 215	Personal Finance (Required)	3
EL 215	Blueprints & Schematics*	2
EL 236	Motor Controls II	2
EL 240	Troubleshooting Techniques II	2
EL 249	National Electric Code III	5
ENGL 105	Technical Writing (or Communications Elective)	3

YEAR II: SECOND SEMESTER

Course #	Course Name	Credits
AE 205	Forklift Operator Training*	1
EL 220A	Programmable Logic Controllers	3
EL 235	Electrical Journeyman's Exam	4
EL 260	Advanced Automation & Controls*	2
EL 265	Commercial Wiring I	4
EL 275A	Applied Construction Skills* - OR -	5
EL 299A	- Occupational Work Experience	
HUM 102	Workplace Ethics (or Gen Ed Elective)	3

COURSE DESCRIPTIONS

EL 100 OSHA 10

1 CR

Standard industry safety practices, job hazards and emergency procedures will be covered. Students will prepare to pass the CPR/First Aid course and follow OSHA requirements for safety. They must know and follow school and departmental policies.

EL 103 SAFETY

2 CR

Standard industry safety practices, job hazards and emergency procedures will be covered. Students must know and follow school and departmental policies.

EL 132A AC/DC CIRCUITS I

4 CR

This course will provide the student with the basic principles of electrical and mechanical secure connections, which are approved by NEC. Electrical instrumentation and measurement devices are included.

EL 136 INSTRUMENTS & MEASUREMENTS

1 CR

Students will identify and learn the safe and proper use of the electrical tools and materials.

EL 139 PRINT READING

2 CR

This course includes use of components, design and installation of branch circuits, design and installation of service equipment, use of sizing and installation of over-current protection, grounding and ground-fault protection and installation. This course also includes reading blueprints and analyzing wiring schematics.

EL 144A WORKPLACE SKILLS & APPLIED PRACTICE I

3 CR

This course is designed to introduce proper procedures on the job, relations with co-workers, team concepts and responsibility. Understanding customer complaints, dynamics of job evaluations, promotions and terminating employees will be studied. Includes practice in time management, communications, leadership activities, problem-solving skills and resource/material management.

EL 148A NATIONAL ELECTRIC CODE I

4 CR

This course is introductory to the NEC and will include definitions, requirements for electrical installation, wiring design and protection, method and materials, equipment for general use, special occupancies equipment and condition.

EL 155 RESIDENTIAL WIRING I

4 CR

A continuation of the study of induction and capacity for distribution systems, transformer stations and three phase transformer and switch connections.

EL 160 MOTOR CONTROLS I

2 CR

Students will have the opportunity to install manual and magnetic starters and contractors. The photoelectric and proximity controls and controls for agricultural and commercial equipment will be studied.

EL 170A TROUBLESHOOTING TECHNIQUES I

3 CR

Students learn how to evaluate customer complaints, observe system operations, formulate a plan, read and interpret schematics and perform operational checks.

EL 190A NATIONAL ELECTRIC CODE II

4 CR

This course will teach the industrial wiring and agriculture requirements for the National Electrical Code examination.

EL 198A WORKPLACE SKILLS & APPLIED PRACTICES II

3 CR

This course is designed to introduce proper procedures on the job, relations with co-workers, team concepts and responsibility. Understanding customer complaints, dynamics of job evaluations, promotions and terminating employees will be studied. Includes practice in time management, communications, leadership activities, problem-solving skills and resource/material management.

EL 215 BLUEPRINTS & SCHEMATICS

2 CR

This class will educate the student on: how to read and interpret blueprints, layout a job from blueprints, calculate materials for a job from blueprints, draw electrical requirements a blueprint conforming to NEC, locate components on a wiring schematic, draw a schematic diagram, and learn work ethics.

EL 220A PROGRAMMABLE LOGIC CONTROLLERS

3 CR

This course will educate the students on how to draw a ladder logic control diagram, apply ladder logic to a process, troubleshoot & correct ladder logic for process control, convert a schematic diagram to ladder logic, to use PLC timers and cascaded timers, and learn work ethics.

EL 235 ELECTRICAL JOURNEYMAN'S EXAM

4 CR

This course teaches and reviews for all the components of the exam for Journeyman certification.

EL 236 MOTOR CONTROLS II

2 CR

Theory and hands-on applications of various motor control equipment and circuits will enable students to install, maintain, and repair actual MCC systems. Instruction includes full voltage reversing and non-reversing starters, reduced voltage autotransformers, two-speed winding starters, and 150 SMC solid-state motor starters.

EL 240 TROUBLESHOOTING TECHNIQUES II

2 CR

Students study all areas of electrical trouble shooting including evaluating customer complaints, observing system operations, formulating a plan, reading and interpreting schematics and performing operational checks.

EL 249 NATIONAL ELECTRIC CODE III

5 CR

A thorough knowledge of the NEC will be gained through practical applications of both residential and commercial

experiences. Instruction includes how to determine feeder size, conductor size and conduit size. Students develop the competency to pass the state prescribed Journeyman exam.

EL 260 ADVANCED AUTOMATION & CONTROLS*

2 CR

Students will work with the sensors; solid-state components and fiber- optic transmission associated with advanced automation controls. This course is directly related to the other advanced motor control and automation courses and is taught together to complete an entire working system.

EL 265 COMMERCIAL WIRING I

4 CR

This course will demonstrate the installation of wiring systems for a classified area; demonstrate bending ability as applied to IMC, GRC, and EMT conduit systems, to size feeders and branch circuits for multi- motor and single-motor systems and apply proper protective devices, and to learn work ethics.

EL 275A APPLIED CONSTRUCTION SKILLS (ELECTIVE)

5 CR

This course will be for the student to apply the knowledge he/she has learned in the course of the program. It will involve the demonstration of various techniques learned throughout the program.

EL 299A OCCUPATIONAL WORK EXPERIENCE (ELECTIVE)

5 CR

This time is spent on specific job-related activities, which may include actual on-the-job training, or special approved projects to accommodate individual interests. This course is designed for the individual student and will supplement his/her regular curriculum.