

ELECTRONICS ENGINEERING TECH (ELEC)

ELEC 101 ELECTRICITY & ELECTRONICS FUND	3 Credit Hours
Introduction to concepts and applications of electricity and electronics related to technical fields. Topics include electron flow, analog vs. digital waveforms, process control, motors, generators, wiring, and drawings. Applied concepts include voltage, current, resistance, conductance and power. (1-2 lecture, 1-2 lab)	
ELEC 102 ELECTRICAL & INSTRUMENTATION 1	3 Credit Hours
Provides an introduction to electrical theory, safety, Electrical & Instrumentation (E&I) testing and process technologies. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)	
Corequisite(s): ELEC 103	
ELEC 103 ELECTRICAL & INSTRUMENTATION 2	3 Credit Hours
Study of flow, pressure, level, temperature, tubing conductors and drawings. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)	
Corequisite(s): ELEC 102	
ELEC 104 ELECTRICAL & INSTRUMENTATION 3	3 Credit Hours
Study of electronic components, hazardous locations, machine bending, and installation of tubing systems. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)	
Corequisite(s): ELEC 102	
ELEC 105 DIRECT CURRENT CIRCUITS	2 Credit Hours
Study of theory and laboratory experiments in direct current simple and complex circuits as well as networks. Concepts covered include voltage, current, resistance, conductance and power. Topics studied are: Ohms Law. Series Circuits, Parallel Circuits, Complex Circuits and Network Theorems. (2 lecture)	
Corequisite(s): ELEC 105L	
Pre/Corequisite(s): MATH 111 or MATH 126	
ELEC 105L DIRECT CURRENT CIRCUITS LAB	1 Credit Hour
Application of concepts introduced in ELEC 105. (2 lab)	
ELEC 115 RES/COMM ELECTRICAL 1	3 Credit Hours
This course introduces students to the electrical trade through knowledge competencies and performance tasks. Topics include: hand bending, electrical theory, electrical test equipment, raceways, boxes and fittings, conductors, and residential, commercial and industrial wiring. (2 lecture, 1 lab)	
Pre/Corequisite(s): MATH 125 or MATH 126 or MATH 128 or MATH 150	
ELEC 116 RES/COMM ELECTRICAL 2	3 Credit Hours
This course is a continuation of ELEC 115 with students expanding their knowledge competencies and performance capabilities within the electrical trade. Topics include: alternating current, motors, grounding, conductor installations, cable tray and electric lighting. (2 lecture, 1 lab)	
Pre/Corequisite(s): ELEC 115	
ELEC 117 RES/COMM ELECTRICAL 3	3 Credit Hours
This course is a continuation of ELEC 116 with students continuing to expand their knowledge competencies and performance capabilities within the electrical trade. Topics include: load calculations, hazardous locations, overcurrent protection, distribution equipment, and transformers. (2 lecture, 4 lab)	
Pre/Corequisite(s): ELEC 116	
ELEC 118 RES/COMM ELECTRICAL 4	3 Credit Hours
This course is a continuation of ELEC 117 with students continuing to expand their knowledge competencies and performance capabilities within the electrical trade. Topics include: lighting applications, heat/freeze protection, motor maintenance, and high-voltage terminations/splices. (1 lecture, 4 lab)	
Pre/Corequisite(s): ELEC 117	
ELEC 120 ALT CURRENT CIRCUITS	2 Credit Hours
Theory and laboratory experiments in the area of alternating current in resistive, capacitive and inductive circuits. Topics covered are: Sinusoidal and non-sinusoidal waveforms, current voltage relationship in RC, RL, and RLC circuits, power factor, phase angle phasor diagram and network analysis. (2 lecture)	
Prerequisite(s): MATH 111 or MATH 128	
Corequisite(s): ELEC 120L	
Pre/Corequisite(s): ELEC 105	
ELEC 120L AC CIRCUITS LAB	1 Credit Hour
Application of concepts introduced in ELEC 120. (2 lab)	

ELEC 124 ANALOG CIRCUITS**3 Credit Hours**

Concepts covered include atomic structures, P-type and N- type materials, rectification, voltage regulation, signal processing, amplification, filters, harmonic distortion, power supplies, transistor operation, thyristor applications and LEDs. Laboratory experiments are used to verify the topics covered in lecture. (2 lecture, 1 lab)

Pre/Corequisite(s): ELEC 105 or ELEC 101 or ELEC 102

ELEC 127 ANALOG CIRCUITS II**2 Credit Hours**

Continuation in the study of analog devices and their behavior in circuits. Devices studied include: Junction field effect transistors (FET), thyristors, SCRS, and UJTS. Topics covered include: JFET amplifier analog switches, frequency response of bipolar and field effect transistor amplifiers, and positive and negative feedback. Laboratory exercises will be used in most of the classroom instruction. (2 lecture)

Prerequisite(s): ELEC 124

Corequisite(s): ELEC 127L

ELEC 127L ANALOG CIRCUITS II LAB**1 Credit Hour**

(2 lab)

ELEC 133 INDUSTRIAL WIRING AND CODE**2 Credit Hours**

Industrial, commercial and residential electrical wiring, safety code, motor starters and controllers. (2 lecture)

Corequisite(s): ELEC 133L

ELEC 133L INDUSTRIAL WIRING/CODE LAB**1 Credit Hour**

Application of concepts introduced in ELEC 133. (2 lab)

ELEC 202 ELECTRICAL & INSTRUMENTATION 4**3 Credit Hours**

Study of motor control, electrical distribution, transformer applications, hydraulic and pneumatic controls. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)

Prerequisite(s): ELEC 104

Corequisite(s): ELEC 203

ELEC 203 ELECTRICAL & INSTRUMENTATION 5**3 Credit Hours**

Study of emergency systems, control elements, transducers, and actuators. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)

Prerequisite(s): ELEC 104

Corequisite(s): ELEC 202

ELEC 204 ELECTRICAL & INSTRUMENTATION 6**3 Credit Hours**

Study of instrument calibration, loop checks, troubleshooting a loop, Programmable Logic Controllers (PLCs) and data networks. Laboratory exercises are designed to provide hands-on practice of concepts. (2 lecture, 1 lab)

Prerequisite(s): ELEC 104

Corequisite(s): ELEC 202

ELEC 210 ELECTRICAL CERTIFICATION**1 Credit Hour**

This is a review course for West Virginia Electrician Apprentice exam. Exams dates are scheduled through the State Fire Marshal's office. The first four chapters of the National Electric Code are reviewed. (1 lecture)

Pre/Corequisite(s): ELEC 117

ELEC 220 AUTOMATED SYSTEMS CONTROL**4 Credit Hours**

Topics include: Programmable Logic Controller (PLC) programming and applications, variable frequency motor drives, robotics, power generation, distribution and transformation, motor and generator theory and telemetry. Laboratory exercises are included in this course. (2 lecture, 2 lab)

ELEC 221 ADVANCED SYSTEMS CONTROL**3 Credit Hours**

A continuation of ELEC 220, topics include Advanced Programmable Logic Controller (PLC) programming and applications, variable frequency motor drives, robotics, discrete control systems and programming. (2 lecture, 2 lab)

Prerequisite(s): ELEC 220 and ELEC 101

ELEC 222 DIGITAL LOGIC CIRCUITS**3 Credit Hours**

The analysis of digital logic circuits and systems with the help of truth table diagrams, numbering systems, Boolean Algebra and Karnaugh maps.

Devices studied include: inverters, logic gates, memory, arithmetic and numbering circuits, AND Gates, OR Gates, NAND and NOR Gates, Exclusive OR and Exclusive NOR Gates. Systems studied include: Half and Full Adders, Encoders, and Decoders Code Converters, Multiplexers, Analog/Digital and Digital/Analog conversion. (2 lecture, 1 lab)

Prerequisite(s): ELEC 101 or ELEC 102 or ELEC 105

ELEC 223 SPECIALIZED TECHNOLOGIES**3 Credit Hours**

Course discusses the theory of operation and application of various state-of-the-art technologies as they apply to modern technological fields.

Communications, automation, controls, sustainability and current innovations are examined. (2 lecture, 2 lab)

Prerequisite(s): ELEC 101 and CS 121

ELEC 224 ELECTRONICS CAPSTONE**1 Credit Hour**

This course serves as a culmination of the Engineering Technology - Electronics option AAS degree program. A project is designed and completed that demonstrates competencies and skills learned within the ELEC courses of the program.

ELEC 225 ELECTRICAL MACHINERY	2 Credit Hours
Theory and applications of direct and alternating current motors and generators; armature winding, field winding, induced voltage, types of AC, DC machines, parallel operation, speed regulation, power factor, efficiency and losses. (2 lecture)	
Prerequisite(s): ELEC 120	
Corequisite(s): ELEC 225L	
ELEC 225L ELECTRICAL MACHINERY LAB	1 Credit Hour
(2 lab)	
ELEC 227 COMPUTERS, NETWORKS & TELEMTRY	3 Credit Hours
An overview of computer hardware, I/O, operating systems, communications, routing, addressing, telemetry devices and networking. (2 lecture, 2 lab)	
Prerequisite(s): ELEC 101	
ELEC 234 SERVICE LEARNING EXPERIENCE	3 Credit Hours
Students are placed on job sites to perform as electrical apprentices to demonstrate competencies and performance tasks. Work includes: hand bending, electrical theory, electrical test equipment, raceways, boxes and fittings, conductors, residential, commercial and industrial wiring. (3 lab)	
Prerequisite(s): ELEC 115 and (MATH 107 or MATH 125)	
ELEC 237 ANALOG & DIGITAL CIRCUITS	3 Credit Hours
An overview of semiconductors, signal processing, amplification, Boolean algebra and Karnaugh maps, truth tables, logic gates, memory, encoders, decoders, analog/ digital and digital/analog conversions. (2 lecture, 2 lab)	
Prerequisite(s): ELEC 101	
ELEC 260 E&I CAPSTONE	1 Credit Hour
Course serves as a culmination of the Electrical & Instrumentation (E&I) certificate program. A project is designed and completed that demonstrates competencies and skills learned within the Multi-Craft Technology (MTEC) and E&I courses of the program. NCCER Examinations are prepared for and taken.	
ELEC 293 COOP IN ELECTRONICS	1-8 Credit Hours
(1-8 lecture)	
ELEC 297 SPECIAL TOPICS	1-4 Credit Hours
(1-4 lecture)	
ELEC 297L ST LAB	0 Credit Hours
(2 lab)	
ELEC 299 INDEPENDENT STUDY/ELECTRONICS	1-8 Credit Hours
ELEC 324 ADVANCED ANALOG CIRCUITS	3 Credit Hours
Advanced theory and application of voltage regulation, signal processing, amplification, filters, harmonic distortion, power supplies, transistor operation, thyristor applications and LEDs. Laboratory experiments are used to verify the topics covered in lecture. (2 lecture, 1 lab)	
Prerequisite(s): ELEC 101 or ELEC 102 or ELEC 105	
ELEC 399 INDEPENDENT STUDY/ELECTRONICS	1-6 Credit Hours
ELEC 420 ADV AUTO SYSTEMS CONTROL	4 Credit Hours
Topics include advanced topics in Programmable Logic Controller (PLC) Programming and applications, variable frequency motor drives, robotics, power generation, distribution and transformation, motor and generator theory and telemetry. Advanced projects and laboratory exercises are included in this course. (2 lecture, 2 lab)	
Prerequisite(s): ELEC 101 or ELEC 102 or ELEC 105	
ELEC 422 ADV DIGITAL LOGIC CIRCUITS	3 Credit Hours
Advanced applications of logic gates, memory, arithmetic and numbering circuits, encoders and decoders, CPUs, storage media and A/D and D/A conversion. (2 lecture, 1 lab)	
Prerequisite(s): ELEC 101 or ELEC 102 or ELEC 105	