BETHLEHEM AREA VOCATIONAL-TECHNICAL SCHOOL
3300 CHESTER AVENUE BETHLEHEM PA 18020
Electrical Construction
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Course Description:

The Electrical Construction class is a three-year program at Bethlehem AVTS. In the first year, students learn the fundamentals of Electrical installations, theory, and the National Electrical Code. Students also learn the basics of metering, conduit bending, lighting fixtures, cable and device identification.

Students in the advanced section of the course learn about service installations, troubleshooting, blueprint reading, alternative energies (solar and wind), motor control, drives, sensors, and the basics of PLC's. We also teach students how to become leaders by experiencing different leadership positions in the shop. Many students also have the opportunity to go out on co-op and work in the field for 4 days a week instead of reporting to class. We have been very successful with students entering the job force through this avenue.

Students who wish to continue in this field should continue their education in an apprenticeship, or a two or four year college. Many students have gone into the IBEW 5-year apprenticeship with tremendous success. We also have the ABC apprenticeship with non-union

contractors. Both of these apprenticeships the students go right to work out of school and go to school at nighttime. Many of our students have continued their education at NCC in the electromechanical and electrical construction fields. Both 2-year degrees can lead further into an electrical engineering degree. We also have students who have gone through traditional job shadowing and internship opportunities in industry that could lead to entry-level employment.

Electricity is part of our everyday life. All you need is power to go out for a period of time and you realize how dependent our society is on it. With this in mind there are hundreds of careers to follow in our field and the need for specialization will continue. But through all of these fields the need to know the basics of electricity is the beginning of it all. Companies realize this and they can take our students and stick them into entry-level positions and they are that much farther ahead due to their knowledge, experience, and background.

Finally, many of our students work for contractors, the IBEW, industry, the public sector, the teledata industry, and many more. Some after at least 5 years of experience have gone into business themselves. It is an ever-evolving field that will use the sharpest minds to design, build, and install to meet the demands of this changing world.

Syllabus: Electrical Construction

Level 1 – MP1 (10- Day Rotation)

Competencies Covered

100 SAFETY
101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders

200- Hand tools
201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers

207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer

300 POWER TOOLS
301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture

Assignments & Assessments

"60 projects" – Performance
NEC – Article 300 & 334, 210, 240
PDP assignments
CONSTRUCTION MATH
Problem solve using whole numbers
Problem solve using fractions
Reading a ruler
Decimals, fractions, percent

Level 1 – MP2

Competencies Covered

100 SAFETY
101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools
201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214 Use adjustable or non-adjustable wrenches
215 Use ratchet and sockets
216 Use nut drivers.

300 POWER TOOLS
301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

500 ANCHORS AND SUPPORTS
501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter
1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1300- NATIONAL ELECTRICAL CODE
1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

Assignments & Assessments
House wiring Ch. 1,2,4,9,12
Task installation list
Electrical Principles Ch. 2, 5, 6 – Basic Electric Theory
House wiring Ch. 9 Rough wiring

Level I (MP3)
Competencies covered
100 SAFETY
101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools
201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS
301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

400 BLUEPRINT READING
401- Identify types of blueprint plans
402- Identity blueprint symbols
403- Interpret blueprint plans
405- Develop electrical details on a residential blueprint
406- Use a measuring tool to scale

500 ANCHORS AND SUPPORTS
501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch

709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS
901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter
1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1300- NATIONAL ELECTRICAL CODE
1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

Assignments and Assessments

Rope tying
Measuring and screwing
House wiring Ch. 1,2,4,9,12
"60 Projects" – Performance
Task installation list
Room Projects – Performance

PPE
NEC – Articles 300, 310, Annex C

Level I – MP4

Competencies covered

100 SAFETY

101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools

201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS

301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

400 BLUEPRINT READING

401- Identify types of blueprint plans
402- Identity blueprint symbols
403- Interpret blueprint plans
405- Develop electrical details on a residential blueprint
406- Use a measuring tool to scale

500 ANCHORS AND SUPPORTS

501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS
901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter
1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1300- NATIONAL ELECTRICAL CODE

1301- Identify the purpose of the NEC

1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.

1304- Identify the publisher of the NEC

1305- Identify the code cycle of the NEC

1306- Identify NFPA 70E (Arc Flash)

Assignments and Assessments

Rope tying

Measuring and screwing

House wiring Ch. 1,2,4,9,12

"60 Projects" – Performance

Room Projects – Performance

PPE

NEC – Articles 300, 310, Annex C

Assignments and Assessments

Rope tying

CLASSROOM STRATEGIES

Think- Pair- Share

Brainstorming

Differentiated training

Station training

Learning guides for certain trainers/ constant follow-up

Team Building

Team assessment/ individual assessment on same test

Electrical Construction Syllabus Level 2

Level II – MP1

Competencies Covered

100 SAFETY

101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools

201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS

301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

400 BLUEPRINT READING

401- Identify types of blueprint plans
402- Identity blueprint symbols
403- Interpret blueprint plans
405- Develop electrical details on a residential blueprint
406- Use a measuring tool to scale

500 ANCHORS AND SUPPORTS

501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS
901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

999- Install RMC

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter

1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1200 ELECTRIC SERVICE
1201- Install an overhead service
1202- Identify parts of an underground service
1209- Identify types of safety disconnect switches
1210- Terminate a service panel/load center

1300- NATIONAL ELECTRICAL CODE
1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

1400 GREEN TECHNOLOGY
1401- Identify renewable energy sources
1404- Identify procedures for installing a solar energy system
1407- Evaluate the demand and consumption of electrical energy

Assignments and Assessments
"60 projects" – Performance
House Wiring Chapter 6- Load Calculations
Solar trainer
House Wiring Chapter 7,8- Services
Scaffold existing subtasks that have been trained
AC/DC trainers
Basic Controls trainers
Whole room projects
NEC – review

Measuring and screwing

PPE
NEC – Articles 300, 310, Annex C

STRATEGIES

Differentiated training

Level II – MP2

100 SAFETY

101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools

201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS

301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

400 BLUEPRINT READING

401- Identify types of blueprint plans
402- Identity blueprint symbols
403- Interpret blueprint plans
405- Develop electrical details on a residential blueprint
406- Use a measuring tool to scale

500 ANCHORS AND SUPPORTS

501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY

601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS

701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES

801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS

901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

1000 WIRED DEVICES

1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT

1101- Use a multimeter
1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1300- NATIONAL ELECTRICAL CODE

1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.

1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

1400 GREEN TECHNOLOGY
1401- Identify renewable energy sources
1404- Identify procedures for installing a solar energy system
1407- Evaluate the demand and consumption of electrical energy

Assignments & Assessments
"60 Projects"
Scaffold existing subtasks that have been trained
AC/DC trainers
NEC
Basic Controls trainers
"Whole Room" projects
Solar trainer
House wiring Ch. 4 – Test and measurement instruments
House wiring Ch. 5 – Understanding Residential building blueprints
House wiring Ch. 12- Raceways
Electrical Principles Ch. 9 – Tests and measurement instruments

Level II – MP3
100 SAFETY
101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools
201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers

207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS
301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

400 BLUEPRINT READING
401- Identify types of blueprint plans
402- Identity blueprint symbols
403- Interpret blueprint plans
405- Develop electrical details on a residential blueprint
406- Use a measuring tool to scale

500 ANCHORS AND SUPPORTS
501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS
901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter
1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1300- NATIONAL ELECTRICAL CODE
1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

1400 GREEN TECHNOLOGY
1401- Identify renewable energy sources
1404- Identify procedures for installing a solar energy system
1407- Evaluate the demand and consumption of electrical energy

Assignments & Assessments
"60 Projects" – Performance
Scaffold existing subtasks that have been trained
AC/DC trainers
"Whole room" projects
Task Installation list

Solar trainer
NEC – review 230, 250
PDP assignments
Emphasis on blueprints and services

Level II – MP4

100 SAFETY

101- Inspect and use personal protective equipment
102– Identify causes of job site accidents
105- Properly don fall protection
106- Identify four classes of fire extinguishers
107- Confirm circuits are de-energized before working on them
108- Perform LO/TO
109- Inspect and use Ladders
110- Complete jobsite hazard analysis form
111- Identify Arc-Flash hazards and protection

200- Hand tools

201- Use screwdrivers
202- Use pliers
203- Use keyhole/drywall saw
204- Use hydraulic knockout/ punch tool
205- Use a tape measure
206- Use wire strippers
207- Use wire cutters
208- Use utility knife
209- Use torpedo level
210- Use a hammer
213- Use a roto-split
214- Use adjustable or non-adjustable wrenches
215- Use ratchet and sockets
216- Use nut drivers.

300 POWER TOOLS

301- Use a hammer drill
302- Use a reciprocating saw
306- Use a drill
311- Use an impact driver

500 ANCHORS AND SUPPORTS
501- Identify, select and install various types of anchors and supports

600 RESIDENTIAL CABLING TECHNOLOGY
601- Install non-metallic (NM) cable for connection to an electrical device
602- Install metal-clad cable(MC)

700 SWITCHES AND RECEPTACLE CIRCUITS
701- Install a duplex receptacle
702- Install a single pole switch
703- Install a 3 way switch
705- Install a split-wired receptacle
706- Install a Ground Fault Circuit Interrupter Receptacle
707- Install an Arc-Fault circuit interruptor
708- Install a timer control switch
709- Install a range receptacle
710- Install a dryer receptacle

800 FIXTURES
801- Install surface-mounted lighting fixture
802- Install recessed lighting fixture
803- Install a ceiling fan
804- Install LED lighting

900 RACEWAYS
901- Install Electrical Metallic Tubing
902- Install PVC
903- Identify flexible raceways
908- Bend a 90
909- Bend an offset
910- Bend a back-to-back 90
911- Cut, ream, and deburr raceway systems
912- Install conductors in a raceway system

999- Install RMC

1000 WIRED DEVICES
1001- Install a hard wired smoke detector
1002- Install a door bell system
1003- Trim out electrical devices
1004- Install an occupancy sensor
1005- Install a photocell

1100 TESTING EQUIPMENT
1101- Use a multimeter

1102- Use a continuity tester
1103- Use a plug-in circuit tester
1104- Use a clamp-on ammeter
1106- Use a circuit tracer
1108- Apply Ohm's/ Watt's Law calculations to electrical applications

1200 ELECTRIC SERVICE
1201- Install an overhead service
1202- Identify parts of an underground service
1209- Identify types of safety disconnect switches
1210- Terminate a service panel/load center

1300- NATIONAL ELECTRICAL CODE
1301- Identify the purpose of the NEC
1303- Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304- Identify the publisher of the NEC
1305- Identify the code cycle of the NEC
1306- Identify NFPA 70E (Arc Flash)

1400 GREEN TECHNOLOGY
1401- Identify renewable energy sources
1404- Identify procedures for installing a solar energy system
1407- Evaluate the demand and consumption of electrical energy

Assignments & Assessments
"60 Projects" – Performance
Scaffold existing subtasks that have been trained
AC/DC trainers
"Whole room" projects
Task Installation list
Solar trainer
NEC – review 230, 250
PDP assignments

999 INTRODUCTION TO MOTOR CONTROL
999 INTRODUCTION TO PLC'S
999 INTRODUCTION TO SENSORS
999 INTRODUCTION TO TROUBLESHOOTING

<u>CLASSROOM STRATEGIES</u>

Think- Pair- Share

Brainstorming

Differentiated training

Station training

Learning guides for certain trainers/ constant follow-up

Team Building

Team assessment/ individual assessment on same test

Bethlehem Area Vocational-Technical School
Curriculum Packet

Electrical Construction

Supplemental Learning Activities

Teambuilding: Once a marking period we will hold an electrical construction "Olympics" within the shop. The last marking period will have a whole day event held at Bangor Park. These events are all task related. The competition will invoke morale and esprit de core within the class.

National *Competitions*. Students will also be able to participate in yearly events held at BAVTS: Chapter Meetings, fundraising and carnival.

NTHS: Level II and Level III students who have received an "A" in their career and technical program as well as a "B" average at their sending school are eligible to become a member of the BAVTS Chapter of the National Technical Honor Society.

- 2019-20

Cooperative Education. Students who have attended six quarters in their career and technical program are eligible to participate in a paid working experience during the PM session of BAVTS. Positions must be available and the student must be recommended by the CTE teacher to be eligible

- 2019-20

Job Shadowing: Students are eligible to visit business and industry partners for one or more days to view the day-to-day operations of this career area.

Internships: Students who have completed six or more quarters of their CTE program are eligible to work for a business and industry partner with the recommendation of the instructor and the availability of assignment.

- 2019-20- Seniors, one at a time for 1 week tours with West End/ Hammer Electric.

Field Trips: Students in this program will on occasion attend field trips that expose them to educational experiences within the career field.

- 2019-20 – IBEW 375
- 2019-20- NCC
- 2019-20- Teambuilding at Bangor Park

Students are recommended to attend post-secondary training upon graduation from BAVTS to ensure success within the career field.

CLASSROOM STRATEGIES

Think- Pair- Share

Brainstorming

Differentiated training

Station training

Learning guides for certain trainers/ constant follow-up

Team Building

Team assessment/ individual assessment on same test

WEEK	LEVEL ONE	LEVEL 2
Week 1	Rotation1: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	Safety Tool ID Tool safety and qual. Measuring, math, and theory Get copies of OSHA 10 handouts Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
WEEK 2	Rotation 1: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill	Followup OSHA 10 Tool safety and qual. ID of bits, blades etc. Services begin LOAD CALCULATIONS

	Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	CW CH. 7 HW CH. 7/8 NEC articles- 100, 230, 250 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 3	Rotation 2: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	Services cont. LOAD CALCULATIONS CW CH. 7 HW CH. 7/8 Grounding Subpanels vs Service Ampacity NEC articles- 100, 230, 250 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 4	Rotation 2: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	Transformers- Copy packets and pass out LOAD CALCULATIONS CW CH. 7 HW CH. 7/8 NEC article- 450 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 5	Rotation 3: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	Services cont. LOAD CALCULATIONS CW CH. 7 HW CH. 7/8 Grounding Subpanels vs Service Ampacity NEC articles- 100, 230, 250 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 6	Rotation 3: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	BOOTH Projects- ?, NOCTI AC/DC trainers- Chapters 6-10 DC Project in booths Motor control prep for SkillsUSA Prep for Apprenticeship test Metering and safety Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter, Signal tracer, Megger. Create a tracking board for students on AC/DC with start and stop dates for each section. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 7	Rotation 4: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers	BOOTH Projects-?, NOCTI AC/DC trainers- Chapters 6-10 DC, 1-6 AC Project in booths Motor control prep for SkillsUSA Prep for Apprenticeship test Metering and safety -Receptacle tester

	Board and booth projects Tool ID Measuring test	Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. Create a tracking board for students on AC/DC with start and stop dates for each section. SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 8	Rotation 4: Math prep and test Safety and test Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill Intro to AC/DC trainers Board and booth projects Tool ID Measuring test	BOOTH Projects- ?, NOCTI AC/DC trainers- Chapters 6-10 DC 1-6 AC Project in booths Motor control prep for SkillsUSA Prep for Apprenticeship test Metering and safety -Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. Create a tracking board for students on AC/DC with start and stop dates for each section. SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 9	FIRST WEEK NEW CLASS Tool safety qual. In drills, Sawzall, Bandsaw, Hammer-drill for all. Types of drill bits Blades and types of Pass out hand tools Projects 1-60–Which ones to prioritize NEC- Chapters 90, 100, 210 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. OHM"S LAW	BOOTH Projects- ?, NOCTI Conductors and Ampacity Cables and types- MC projects in booths NEC- Article 310-15(b)16 AC/DC trainers- Chapters 6-10 DC, 1-6 AC Put a team on SOLAR trainer. OSHA 10- Lesson- Devices/Boxes- box fill SkillsUSA prep WIRED DEVICES Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 10	Booth projects- 6,10, 16, 27-31, 4 way and a team project Boxes and box fill- NEC- Chapters 90, 100, 210 OSHA 10- Lesson- Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. OHM"S LAW	OSHA 10- Lesson- Conductors and Ampacity Cables and types- MC projects in booth NEC- Article 310-15(b)16 AC/DC trainers- Chapters 6-10, DC 1-6 AC TRACK INDIVIDUAL STUDENTS CLOSELY SkillsUSA prep WIRED DEVICES Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 11	Booth projects- 6,10, 16, 27-31, 4 way and a team project Boxes and box fill- NEC- Chapters 90, 100, 210 OSHA 10- Lesson- Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. OHM"S LAW	OSHA 10- Lesson- AC/DC trainers- Chapters 6-10, DC 1-6 AC Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. SkillsUSA prep Types of knots- rope tying

		Measurement tasks Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 12	Booth projects- 6,10, 16, 27-31, 4 way and a team project OSHA 10- Lesson- Devices and types/ratings Conductor ampacity Cables- types, sizes Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. OHM"S LAW	OSHA 10- Lesson- AC/DC trainers- Chapters 6-10, DC 1-6 AC Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. SkillsUSA prep Types of knots- rope tying Measurement tasks Pipe Bending Project in shop- Using strut, straps, fittings(draw in project book) Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 13	Booth projects- 6,10, ? and a team project OSHA 10- Lesson- Devices and types/ratings Conductor ampacity Cables- types, sizes Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	OSHA 10- Lesson- AC/DC trainers- Chapters 6-10, DC 1-6 AC Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. SkillsUSA prep Types of knots- rope tying Measurement tasks Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 14	OSHA 10- Lesson- Devices and types/ratings Conductor ampacity Cables- types, sizes Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	OSHA 10- Lesson- AC/DC trainers- Chapters 6-10, DC 1-6 AC Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. KO set- layout SkillsUSA prep Types of knots- rope tying Measurement tasks Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 15	OSHA 10- Lesson- Lighting fixtures/fans- Chapter ? in HW Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	OSHA 10- Lesson- AC/DC trainers- Chapters 6-10, DC 1-6 AC Chapter 12 HW- Raceways PVC pipe and bending- do a project out by poles Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.

Week 16	OSHA 10- Lesson- Lighting fixtures/fans- Chapter ? in HW Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Week of all the projects- Smokes, doorbell, 3 ways, 4 ways, etc. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 17	OSHA 10- Lesson- Metering-Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. AC/DC trainers- Chapters 1-10 Create a tracking board for students on AC/DC with start and stop dates for each section. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Blueprints- reading and drawing SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 18	Metering-Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. AC/DC trainers- Chapters 1-10 Create a tracking board for students on AC/DC with start and stop dates for each section. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Blueprints- reading and drawing Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC. SkillsUSA prep
Week 19	Metering-Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. AC/DC trainers- Chapters 1-10 Create a tracking board for students on AC/DC with start and stop dates for each section. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Blueprints- reading and drawing SkillsUSA prep Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 20	Metering-Receptacle tester Continuity, Ohmmeter, Ammeter, Voltage Tester, Voltmeter. AC/DC trainers- Chapters 1-10 Create a tracking board for students on AC/DC with start and stop dates for each section. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Lighting Fixtures and Lamps HW chapter 16. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.

Week 21	Blueprints- reading and drawing Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Motors and Motor Control NEC art.- 430 Solar/ Wind- Go through Solar, wind, solar/wind, Material ID, interactive disk. Split class in half and rotate halfway through. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 22	Blueprints- reading and drawing Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Motors and Motor Control NEC art.- 430 Solar/ Wind- Go through Solar, wind, solar/wind, Material ID, interactive disk. Split class in half and rotate halfway through. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 23	Blueprints- reading and drawing Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Motors and Motor Control NEC art.- 430 Solar/ Wind- Go through Solar, wind, solar/wind, Material ID, interactive disk. Split class in half and rotate halfway through. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 24	Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Motors and Motor Control NEC art.- 430 Solar/ Wind- Go through Solar, wind, solar/wind, Material ID, interactive disk. Split class in half and rotate halfway through. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 25	Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	CABLING- COAX/ CAT 5 Fire alarm/data Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 26	Chapter 12 HW- Raceways Conduit bending, Conduit fill, NEC- Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	CABLING- COAX/ CAT 5 Fire alarm/data Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 27	Chapter 12 HW- Raceways	LOAD CALCULATIONS

	Conduit bending, Conduit fill, NEC-Annex C, Threading pipe, Connectors, Couplings, Fittings, Boxes, Supports, etc. Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 28	Services HW Ch. 6,7,8 Grounding Subpanels vs. Service Ampacity- NEC articles- 100, 230, 250, 310 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	MATERIAL ID and Use of Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 29	Services HW Ch. 6,7,8 Grounding Subpanels vs. Service Ampacity- NEC articles- 100, 230, 250, 310 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	HVAC controls and power up Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 30	Services HW Ch. 6,7,8 Grounding Subpanels vs. Service Ampacity- NEC articles- 100, 230, 250, 310 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	NEC/Projects/Resume's/Interviews Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 31	Services HW Ch. 6,7,8 Grounding Subpanels vs. Service Ampacity- NEC articles- 100, 230, 250, 310 Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	NEC/Projects/Resume's/Interviews Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 32	LOAD CALCULATIONS Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	NEC/Projects/Resume's/Interviews Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 33	LOAD CALCULATIONS Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.

Week 34	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 35	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.
Week 36	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.	Projects Fridays- Theory, math, NOCTI prep, OSHA, Literacy, and NEC.