Electrical Apprenticeship: Related Technical Instruction Outline, Years 1 to 4

[Your institution] · [Program name] · Registered apprenticeship RTI

How to use this outline

This outline sets out the related technical instruction (RTI) an apprentice electrician completes over four years, as eight courses of about one semester each, two per year. It is a starting point. Edit it to match the work processes and related instruction in your registered apprenticeship standards, and the National Electrical Code (NEC) edition your state enforces.

Text in [square brackets] is for your institution to fill in. Everything else can be changed too.

Your program

- Program and sponsor: [program name, sponsor or employer]
- Registered with: [state apprenticeship agency or the U.S. Department of Labor Office of Apprenticeship]
- Related instruction each year: [144 hours is the usual minimum; use the hours in your standards]
- Instructor: [name] · Contact: [how apprentices reach the instructor]
- Class times and place: [days, times, location or online]
- Code edition: [NEC edition your state enforces]

What every course builds

- Apply electrical theory to practical electrical problems.
- Use the National Electrical Code for electrical design and installation.
- Interpret electrical drawings.
- Design motor control circuits.

The NEC is used in every course, and the last two courses prepare apprentices for the journeyman written exam.

Year 1

Course 1: Electrical Apprenticeship I

Foundational knowledge for a career as a journeyman electrician: safe work practices, an introduction to the NEC, electrician's math, basic electrical theory and introductory wiring methods.

By the end, the apprentice can:

- explain safe work practice procedures
- explain voltage, current and resistance
- explain the structure and application of the NEC
- explain apprentice rights under [your state's] apprenticeship law

- solve math problems as applied to electricity

In this course on Zelvi: the lab safety manual and the direct current manual.

Course 2: Electrical Apprenticeship II

Electrical materials, circuit theory, residential installations, basic electrical drawings and electrical test equipment.

By the end, the apprentice can:

- solve DC electric circuit problems
- identify electrical test equipment
- identify common electrical materials and components
- interpret basic electrical drawings
- use conductor sizing tables
- design conduit and pull box systems according to the NEC
- apply the NEC to basic residential installations

Year 2

Course 3: Electrical Apprenticeship III

AC circuit theory, three-phase circuit theory, branch circuits, feeders and services.

By the end, the apprentice can:

- solve basic AC electrical circuits
- analyze three-phase circuits
- design branch and feeder circuits according to the NEC
- design services according to the NEC
- apply the NEC to basic commercial installations

Course 4: Electrical Apprenticeship IV

Equipment grounding, transformers, load calculations and commercial installations.

By the end, the apprentice can:

- perform load calculations according to the NEC
- design equipment grounding systems according to the NEC
- apply the NEC to transformer installations
- interpret intermediate electrical drawings
- apply the NEC to commercial installations

Year 3

Course 5: Electrical Apprenticeship V

Overcurrent protection, switches, panelboards, bonding, grounding and advanced plan interpretation.

By the end, the apprentice can:

- describe switchgear and switchboard installation standards
- select overcurrent protection devices
- describe requirements for system grounding and bonding
- interpret electrical drawings
- apply the NEC to basic industrial installations

Course 6: Electrical Apprenticeship VI

Lighting, appliances, heating, motors and industrial installations.

By the end, the apprentice can:

- describe requirements for installing equipment for general use
- describe the operation of DC motors
- describe common lighting types and applications
- apply the NEC to heating, appliance and lighting circuits
- apply the NEC to industrial installations

Year 4

Course 7: Electrical Apprenticeship VII

Motor installations, motor control, special motors and industrial installations, with preparation for the journeyman written exam.

By the end, the apprentice can:

- design motor control circuits
- size motor control circuits according to the NEC
- size motor circuits and their protection according to the NEC
- design commercial electrical services
- solve residential, commercial and industrial application problems according to the NEC

Course 8: Electrical Apprenticeship VIII

Special locations, conditions and equipment, including communication circuits, with preparation for the journeyman written exam.

By the end, the apprentice can:

- apply the NEC to fire alarm, communications and control circuits
- size Class 2 and Class 3 circuits according to the NEC
- apply the NEC to hazardous locations
- solve residential, commercial and industrial application problems according to the NEC

How learning is checked

A suggested pattern, to change to your own standards:

- individual and group assignments
- a mid-term and a final exam in each course
- a core competency exam, passed at [70%] or higher

Zelvi records each apprentice's practice and the RTI hours you take attendance for, against the plan for each year.

Your institution's policies

- Attendance and make-up hours: [your policy]
- Academic honesty: [your policy]
- Accommodations: [who apprentices contact, and how]
- Texts and references: [the textbook or materials your program uses, and the NEC edition]