

## Introduction to Electrics 2018

*Presented by Richard Cadena, ETCP RT/CEE*

Introduction to Electrics is a half-day class covering electrical safety, personal protective equipment (PPE), basic electric circuits, power monitoring, and basic power distribution. This class is primarily for beginning to intermediate electricians and technicians. It covers enough basic electricity, circuit laws, and theory to provide a foundation of understanding electrical safety and how to minimize the risk of accidents.

### Instructor Bio 2018

Richard Cadena is an ETCP Certified Entertainment Electrician and an ETCP Recognized Trainer with 32 years of experience in the entertainment lighting industry. He is the author of:

“Electricity for Entertainment Electricians & Technicians, 2nd Edition”

“Automated Lighting: The Art and Science of Moving Light, 2nd Edition”

“Lighting Design for Modern Houses of Worship”

“Focus on Lighting Technology”

He is also the technical editor for PLASA Media and a columnist for Lighting & Sound America, Lighting & Sound International, and Protocol magazines. As a freelance lighting designer and lighting consultant he has worked on concert tours, television, theatre, motion picture productions, and he has designed dozens of lighting systems for permanent installations. He is a member of IATSE Local 205 in good standing. Current and former clients include Cirque du Soleil, Carnival Cruise Lines, SeaWorld, Saturday Night Live, NBA, IATSE Locals 1, 2, 4, 6, 8, 16, 58, 479, and more.

### Related Web Sites:

[www.rcad.me](http://www.rcad.me)

[www.entertainmentelectricity.com](http://www.entertainmentelectricity.com)

[www.APTXL.com](http://www.APTXL.com)

[www.lightingandsoundamerica.com](http://www.lightingandsoundamerica.com)

[www.lsonline.co.uk](http://www.lsonline.co.uk)

[www.esta.org/Protocol/protocol.html](http://www.esta.org/Protocol/protocol.html)

# APT Entertainment Electrics Training Outline

- I. Basic Electricity and Circuit Laws
  - a. Terminology
  - b. Complete circuits and open circuits
  - c. Path of least resistance
  - d. Voltage summing
- II. Ohm's Law
- III. Five Ways to Protect Against Hazards of Electricity
  - a. Insulation
  - b. Isolation
  - c. Circuit Breakers
  - d. Grounding
  - e. GFCIs
- IV. Electrical Safety
  - a. Imminent danger
  - b. Electric shock
    - i. Factors influencing severity of injury due to electric shock
    - ii. Ohm's law
    - iii. Human reaction to electric current
    - iv. Resistance of the human body
  - c. Hazards of electricity
    - i. Fire ignition
    - ii. Electric shock
    - iii. Arc flash
    - iv. Arc blast
- V. Personal Protective Equipment
  - a. Shock Protection
    - i. Gloves
    - ii. Shoes
    - iii. Insulating Mats and Blankets
  - b. Arc Flash/Arc Blast Protection
    - i. AR Clothing
    - ii. Eye Protection
    - iii. Hearing Protection
    - iv. Head Protection
  - c. Meters
    - i. Categories of Meters
    - ii. True Sine Wave Versus Average Reading Meters
- VI. In Case of Accident
- VII. Types of Fire Extinguishers and Their Uses
- VIII. Codes and Regulations
  - a. NEC/CEC
- IX. Power Distribution Systems
- X. Three-Phase Power
- XI. Transformers and 3-phase Connections
  - a. 4-wire plus ground
  - b. ungrounded conductors, grounded conductor, grounding conductor
  - c. Delta-Wye connected transformer