WBFAA Apprentice Program
Final v2.000
NEW REVISED August 2013 Syllabus

First Semester
14 WEEKS 84 HOURS
Midterm and Final Exam = 16 in class LAB HOURS
10 Webinars @ one hours = 10 HOURS
Mandatory ONLINE ORIENTATION = ONE HOUR

S1W1 MANDATORY ONLINE ORIENTATION

S1W1 – Effective Communication Skills
Module 00107-04
New Module 00107-09-

- 1.0.0 Introduction
- 2.0.0 The Communications Process
- 2.2.0 Writing on the Job
- 3.0.0 Listening and Speaking Skills
- 3.1.0 Active Listening on the Job
- 3.1.1 Barriers to Listening
- 3.2.0 Speaking on the Job
- 3.2.1 Placing Telephone Calls
- 3.2.2 Receiving Telephone Calls
- 4.0.0 Reading and Writing Skills
- 4.1.0 Reading on the Job

WEBINAR S1W1 Intro to NFPA, CFC,NEC,CEC

S1W2 – Employability Skills
Module 00108-04
New Module 00108-09

- 1.0.0 Introduction
- 2.0.0 The Construction Business
- 2.1.0 Entering the Construction Workforce
- 3.0.0 Critical Thinking Skills
- 4.0.0 Computer Skills
- 5.1.0 Self-Presentation Skills
- 5.1.1 Personal Habits
- 5.1.2 Work Ethic
- 5.1.3 Lateness and Absenteeism
- 5.2.0 Conflict Resolution

5.2.1 Resolving Conflicts with Teammates
6.0.0 Workplace Issues

WEBINAR S1W2 NFPA 72 2013 - Chapter 1 and 3 Maneuvering code / Terminology

S1W3 – Basic Safety
Module 00101-04
New Module 00101-09
1.0.0 Introduction
2.0.0 Importance of Safety
3.0.0 Accidents: Causes and Results
3.2.0 What Causes Accidents?
3.3.0 Housekeeping
3.4.0 Company Safety Policies and OSHA Regulations
3.4.1 The Code of Federal Regulations
3.5.0 Reporting Injuries, Accidents, and Incidents
4.0.0 Hazard Recognition, Evaluation, and Control
5.0.0 Elevated Work and Fall Protection
6.0.0 Ladders and Stairs

WEBINAR S1W3 NFPA 72 2013-Chapter 10 thru 10.6.10 Fundamentals

S1W4 – Basic Safety Part II
Module 00101-04
New Module 00101-09
7.0.0 Scaffolds
7.2.0 Inspecting Scaffolds
8.0.0 Struck By Hazards
9.0.0 Caught –In-Between Hazards
10.0.0 Electrical Safety Guidelines
10.1.0 Basics of Electricity
10.2.0 Working Near Energized Electrical Equipment
10.6.0 If Someone is Shocked
11.0.0 Personal Protective Equipment
12.0.0 Hazard Communication Standard
13.0.0 Other Job Site Hazards
13.8.0 Fire Safety
13.8.1 How Fires Start
13.8.2 Fire Prevention

WEBINAR S1W4 NFPA 72 2013 Chapter 10.7- 12.2.3 Fundamentals/Circuits and Pathways

S1W5 – Basic Construction Math Part I

Module 00102-04
New Module 00102-09

1.0.0 Introduction
2.0.0 Whole Numbers
2.1.0 Parts of a Whole Number
2.2.0 Adding Whole Numbers
2.3.0 Subtracting Whole Numbers
3.0.0 Working with Measurements
4.0.0 What are Fractions?
4.4.0 Adding Fractions
4.5.0 Subtracting Fractions
4.6.0 Multiplying Fractions
4.7.0 Dividing Fractions

WEBINAR S1W5 NFPA 2013 Chapter 10.1, 10.2, 10.3, 10.4

S1W6 – Basic Construction Math Part II
Module 00102-04
New Module 00102-09

5.0.0 Decimals
5.1.0 Comparing Whole Numbers with Decimals
5.2.0 Comparing Decimals with Decimals
5.3.0 Adding and Subtracting
5.4.0 Multiplying Decimals
5.5.0 Dividing with Decimals
5.6.0 Rounding Decimals
6.0.0 Conversion Process
6.1.0 Converting Decimals to Percentages an Percentages to Decimals
6.3.0 Converting Decimals to Fractions

WEBINAR S1W6 NFPA 2013 Chapter 10.5

S1W7 – Basic Construction Math Part III
Module 00102-04
New Module 00102-09

7.0.0 Introduction to Construction Geometry
7.1.0 Angles
7.2.0 Shapes
7.2.1 Rectangle
7.2.2 Square
7.2.3 Triangle
7.2.4 Circle
7.3.0 Area of Shapes
7.4.0 Volume of Shapes

WEBINAR S1W7 No class. Mid Term and Lab.

Midterm Lab Schedule

1. CPR Training (Handouts, Lab)
2. Lifting (Section 1; 6.0.0, Lab)
3. Aerial Work (Section 1; 7.1.0, Lab)
4. Fire Safety (Section 1; 9.1.0, 9.3.0)
5. Use of Fire Extinguisher (Handouts & Lab)
6. Midterm Review
7. Midterm Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Core Curriculum Textbook

S1W8 – Introduction to Hand Tools Part I

Module 00103-04

New Module 00103-09

- 1.0.0 Introduction
- 1.1.0 Safety
- 2.0.0 Hammers
- 2.1.0 The Claw Hammer
- 2.2.0 The Ball Peen Hammer
- 2.3.0 The Ball Peen Hammer: Safety and Maintenance
- 3.0.0 Ripping Bars and Nail Pullers
- 4.0.0 Chisels and Punches
- 5.0.0 Screwdrivers
- 5.1.0 How to Use a Screwdriver
- 5.2.0 Screwdriver: Safety and Maintenance
- 6.0.0 Pliers and Wire Cutters
- 7.0.0 Wrenches
- 8.0.0 Sockets and Ratchets
- 10.0.0 Rulers and Other Measuring Tools
- 11.0.0 Levels

WEBINAR S1W8 NFPA 2013 Chapter 10.6, 10.7, 10.8, 10.9, 10.10

S1W9 – Introduction to Hand Tools Part II

Module 00103-04

New Module 00103-09

- 12.0.0 Squares
- 13.0.0 Plumb Bob

14.0.0 Chalk Lines
15.0.0 Utility Knives
16.0.0 Saws
17.0.0 Files and Rasps
18.0.0 Clamps
19.0.0 Chain Falls and Come-Alongs
20.0.0 Shovels
20.2.0 Shovels: Safety and Maintenance

WEBINAR S1W9 NFPA 2013 Chapter 10.11, 10.12, 10.13

S1W10 – Basic Rigging Part I
Module 00106-04
New Module 00106-09

1.0.0 Introduction
2.0.0 Slings
2.2.0 Synthetic Slings
2.3.0 Alloy Steel Chain Slings
2.4.0 Wire Rope Slings
3.0.0 Hitches
4.0.0 Rigging Hardware
4.1.0 Shackles
4.2.0 Eyebolts
4.4.0 Rigging Hooks

WEBINAR S1W10 NFPA 2013 Chapter 10.14, 10.15, 10.16

S1W11 – Basic Rigging Part II
Module 00106-04
New Module 00106-09

5.0.0 Sling Stress
6.0.0 Hoists
7.0.0 Rigging Operations and Practices
7.4.0 Load Control
7.4.4 Risk Management

WEBINAR S1W11 NFPA 2013 Chapter 10.17, 10.18, 10.19

S1W12 –Construction Drawings Part I
Module 00105-04
New Module 00105-09

1.0.0 Introduction

2.0.0 The Drawing Set
2.1.0 Components of Construction Drawings
2.1.1 Title Block 2.1.2 Border
2.1.3 Drawing Area
2.1.4 Revision Block
2.1.5 Legend

WEBINAR S1W12 NFPA 2013 Chapter 12

S1W13 –Construction Drawings Part II
Module 00105-04
New Module 00105-09
3.0.0 Six Types of Construction Drawings
3.1.0 Civil Plans
3.2.0 Architectural Plans
3.3.0 Structural Plans
3.4.0 Mechanical Plans
3.5.0 Plumbing/Piping Plans
3.6.0 Electrical Plans
3.7.0 Fire Protection Plans
4.0.0 Scale
5.0.0 Lines of Construction
6.0.0 Abbreviations, Symbols, and Keynotes

WEBINAR S1W13 NFPA 2013 Chapter 12

S1W14 – Introduction to Power Tools
Module 00104-04
New Module 00104-09
1.0.0 Introduction
2.0.0 Electric, Pneumatic, and Hydraulic Tools
2.1.0 Electric, Pneumatic, and Hydraulic Tools: Safety
3.0.0 Power Drills
3.1.0 Types of Power Drills
3.1.2 Power Drills: Safety and Maintenance
4.0.0 Saws
5.0.0 Grinders and Sanders
5.1.0 Angle Grinders, End Grinders, and Detail Grinders
5.1.2 Grinders: Safety and Maintenance
5.2.0 Bench Grinder
5.2.2 Bench Grinder: Safety and Maintenance

WEBINAR S1W14 No Class. Final and Lab.

Final Lab Schedule

1. Introduction to Blueprints (Section 5; 1.0.0, 1.1.0, 1.2.0, Lab)
2. Introduction to Blueprints (Section 5; 1.3.0, 1.4.0, 2.0.0, 2.1.0, 2.2.0, 2.3.0, 2.4.0, 2.5.0, Lab)
3. Working with Measurements (Section 2; 3.0.0, 3.1.0, 3.2.0)
4. Scale (Section 5; 3.0.0, 3.1.0, Lab)
5. Introduction to Blueprints (Section 5; 5.0.0, 6.0.0, 7.0.0, Lab)
6. Final Exam Review
7. Final Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Core Curriculum Textbook

Second Semester

10 WEEKS 60 HOURS

OLD WAS 12 WEEKS 72 HOURS

Midterm and Final Exam = 16 in class LAB HOURS

8 Webinars @ one hour = 8 hours

S2W1 – Introduction to the Trade
Module 33101-04
New Module 33101-10

1.0.0 Introduction
1.2.0 Electronic Systems Opportunities
1.3.0 Integrated Systems
2.0.0 Certification and Licensing
3.0.0 Professional Responsibilities
4.0.0 Standards and Building Codes
5.0.0 Documentation
6.0.0 Training
7.0.0 Tools and Methods

WEBINAR S2W14 NFPA 2013 Chapter 17.1, 17.2, 17.3, 17.4

S2W2 – Wood and Masonry Construction Methods
Module 33102-04
Module 33102-10

1.1.0 Introduction
2.0.0 Building Materials

2.1.0 Gypsum Board
2.2.0 Masonry Materials
2.2.1 Concrete Masonry Units
2.2.2 Brick
2.2.3 Stone
3.0.0 Wood Frame Construction
3.1.0 Floor Construction
3.1.1 Girders
3.1.2 Floor Joists
3.1.3 Wood I-Beams
3.1.4 Trusses
3.1.7 Subflooring
3.2.0 Wall Construction
3.2.4 Firestops
3.3.0 Ceiling Construction
3.4.0 Roof Construction
3.4.1 Roof Components
3.4.4 Dormers
3.5.0 Post-and-Beam Framing
4.0.0 3.6.0 Wall Framing in Masonry Fasteners and Anchors
4.1.0 Screws
4.1.1 Wood Screws
4.1.3 Concrete/Masonry Screws
4.1.6 Drywall Screws
4.2.0 Nonthreaded Fasteners
4.3.0 Screw Anchors
4.4.0 Hollow Wall Anchors
5.0.0 Tools Used for Running Cable
5.1.0 Guidelines for Using Power Tools
5.1.1 Safety Rules for All Power Tools
5.2.0 Drilling Tools
5.3.0 Cutting Tools

WEBINAR S2W2 NFPA 2013 Chapter 17.5

S2W3 – Concrete and Steel Construction Methods
Module 33102-04
Module 33103-10

1.0.0 Introduction
2.0.0 Building Materials
2.1.0 Concrete
2.2.0 Metal

3.0.0 Commercial Construction Methods
3.1.0 Floors
3.2.0 Walls
3.4.0 Roof Structure
3.5.0 Ceilings
4.0.0 Fire-Rated and Sound-Rated Walls
5.0.0 Fasteners and Anchors
5.2.0 Bolt and Screw Types
5.5.0 Installing Fasteners
5.10.0 Guidelines for Drilling Anchor5 Holders
6.0.0 Special Tools
7.0.0 Project Schedules

WEBINAR S2W3 NFPA 2013 Chapter 17.6

S2W4 – Pathways and Spaces Part I
Module 33103-04
Module 33104-10

1.0.0 Introduction
2.0.0 Raceways
3.0.0 Conduit
3.1.0 Conduit as a Ground Path
3.2.0 Electrical Nonmetallic Tubing
3.4.0 Electrical Metallic Tubing
3.5.0 Rigid Metal Conduit
3.90 Intermediate Metal Conduit
3.10.0 Rigid Nonmetallic Conduit
3.10.4 Liquidtight Flexible Nonmetallic Conduit
3.11.0 Flexible Metal Conduit
4.0.0 Metal Conduit Fittings
4.1.0 Couplings
4.2.0 Conduit Bodies
4.2.5 Threaded Weatherproof Hubs
4.3.0 Insulating Bushings
4.4.0 Offset Nipples
13.0.0 Boxes
13.1.0 Metal Boxes
13.1.1 Pryouts
13.1.2 Knockouts
13.2.0 Nonmetallic Boxes
13.3.0 Low Voltage Boxes
6.0.0 Sealing Fittings
7.0.0 Cable and Raceway Supports
7.1.0 Straps

7.2.0 Standoff Supports
7.5.1 Cable Ties
7.5.2 Cable Hangers
8.0.0 Surface Metal and Nonmetallic Raceways

WEBINAR S2W4 NFPA 2013 Chapter 17.6 cont.

S2W5 – Pathways and Spaces Part II
Module 33103-04
9.0.0 Cable Trays
9.2.0 Cable Tray Supports
10.0.0 Storing Raceways
12.0.0 Underground Systems
12.1.0 Duct Materials
12.4.0 Controlled Environment Vaults
13.0.0 Boxes
14.0.0 Making a Rigid Conduit-to-Box Connection
15.5.0 Suspended Ceilings
16.1.0 Pathways
16.2.0 Spaces

WEBINAR S2W5 No Class. Mid and Lab

Midterm Lab

1. Commercial Building Tour
2. Drill use and bit selection
3. Power cutting tools
4. Conduit to Box connections
5. 90° bends
6. Midterm Review
7. Midterm Exam
   What to bring:
   1. Notepad
   2. Pens or pencils
   Electronic Systems Technician: Level 1 Textbook

S2W6 – Hand Bending of Conduit
Module 33107-04
1.0.0 Introduction
2.0.0 Cutting, Reaming, and Threading Conduit
2.1.0 Cutting Conduit with a Hacksaw
2.2.0 Cutting Conduit with a Pipe Cutter
2.3.0 Reaming Conduit

2.4.0 Threading Conduit
2.5.0 Cutting and Joining PVC Conduit
3.0.0 Hand Bending Equipment
3.1.0 Geometry Required to Make a Bend
3.2.0 Making a 90-Degree Bend
3.3.0 Gain
3.4.0 Back-to-Back 90-Degree Bends
3.5.0 Offsets
3.6.0 Parallel Offsets
3.7.0 Saddle Bends

WEBINAR S2W6 NFPA 2013 Chapter 17.7

S2W7 – Low-Voltage Cabling Part I
Module 33108-04

1.1.0 Introduction
2.1.0 Conductor Wire Size
2.2.0 Conductor Material
2.3.0 Insulation
2.4.0 Conductor Voltage Drop
3.1.0 NEC Classifications and Ratings
3.2.0 PTLC, Fire Alarm, and Class 2/3 Cable Styles and Construction
3.3.1 Unshielded Twisted-Pair Cable (UTP)
3.3.2 Unshielded Twisted-Pair Patch Cords
3.3.3 Undercarpet Telecommunication Cable (UTC)
3.3.4 Screened Twisted-Pair (ScTP) Cable and Patch Cord
3.3.5 Shielded Twisted-Pair (STP) Cable, Enhanced Shielded Twisted-Pair (STP-A) Cable, and STP Patch Cord
3.3.6 Coaxial Cable
3.4.0 Optical Fiber Cable

WEBINAR S2W7 NFPA 2013 Chapter 17.7 cont.

S2W8 – Low-Voltage Cabling Part II
Module 33108-04

4.0.0 Commercial Cable Installation
4.1.0 Fish Tapes
4.2.0 Power Conduit Fishing Systems
4.8.1 Setting up the Cable Reels or Boxes
4.8.2 Preparing Conduit Pathways for Cables
4.8.3 Installing a Pull Line in Conduit or Inner duct
4.8.4 Installing a Pull Line in Open Ceilings
4.8.5 Preparing Cable Ends for Pulling

4.8.6 Types of Pulling Lines
4.9.0 Using Cable Pulling Equipment
4.10.0 Pulling Safety
5.0.0 Residential Low-Voltage Cable Installation
5.1.0 Residential Unit Communication/Data Cabling Requirements and Grades
5.1.1 Residential Unit Grade 1 Service Cabling
5.1.2 Residential Unit Grade 2 Service Cabling
5.1.3 Residential Unit Communication/Data Cable Types
5.2.0 Understanding the Job
5.3.0 Residential Cable Installation Requirements/Considerations
5.4.0 Drilling and Fishing Cable in Existing Construction

WEBINAR S2W8 NFPA 2013 Chapter 17.7 cont.

S2W9 – Low-Voltage Cabling Part III
Module 33108-04
6.0.0 Interior Low-Voltage Cabling Installation Requirements
6.1.0 Class 1 Circuits
6.2.0 Class 2 and 3 Circuits
6.4.0 Nonpower-Limited Fire Alarms Circuits
6.5.0 Power-Limited Fire Alarms Circuits
6.6.0 Optical Fiber Cable
6.9.0 Coaxial CATV Cable Installation within Buildings
7.1.0 Basic Telephone Operation
7.2.0 Multiplexing
7.3.0 Key Systems and Private Branch Exchanges (PBXs)
7.4.0 Premises Cable
7.5.0 Installation Standards
7.5.1 Outside Plant
7.5.2 Commercial Premises Wiring
7.5.3 Residence Premises Wiring
7.6.0 Grounding and Bonding
8.0.0 Electromagnetic Interference (EMI) Considerations
8.1.0 EMI Guidelines

WEBINAR S2W9 NFPA 2013 Chapter 17.8

S2W10 – Introduction to the NEC
Module 33107-10
1.0.0 Introduction
2.0.0 Purpose of the NEC
3.0.0 Layout of the NEC
4.0.0 Navigating the NEC

4.1.0 Chapter 1
4.2.0 Chapter 2
4.3.0 Chapter 3
4.4.0 Chapter 4
4.5.0 Chapter 5
4.6.0 Chapter 6
4.7.0 Chapter 7
4.8.0 Chapter 8
4.9.0 Low-voltage Applications
5.0.0 Testing Organizations

WEBINAR S2W10 No Class. Final and Lab

Final Lab Schedule

1. Knots (Handout, Lab)
2. Lab: Offsets
3. Lab: Parallel offset bends
4. Lab: Saddle bends
5. Lab: Cutting, reaming and treading
6. Lab: Joining PVC
7. Lab: Cable identification
8. Lab: Pulling cables
9. Lab: Drilling and fishing cables
10. Final Exam Review
11. Final Exam

What to bring:

1. Notepad
2. Pens or pencils

Electronic Systems Technician: Level 1 Textbook

Third Semester

14 WEEKS - 84 HOURS

Midterm and Final Exam = 16 in class LAB HOURS

10 Webinars @ one hour = 10 HOURS

S3W1 – DC Circuits Part I

Module 33201-05

1.0.0 Introduction
2.0.0 Atomic Theory
2.1.0 The Atom
2.2.0 Conductors and Insulators
3.0.0 Electrical Power Generation and Distribution

4.0.0 Electrical Charge and Current
4.3.1 Characteristics of Resistance
50.0 Ohm's Law
6.0.0 Schematic Representation of Circuit Elements
70.0 Resistors
7.1.0 Resistor Color Codes

WEBINAR S3W1 NFPA 2013 Chapter 17.9, 17.10, 17.11

S3W2 – DC Circuits Part II
Module 33201-05
8.0.0 Electrical Power
8.1.0 Power Equation
8.2.0 Power Rating of Resistors
9.0.0 DC Circuits
9.1.0 Series Circuits
9.2.0 Parallel Circuits
9.3.0 Series-Parallel Circuits
10.0.0 Solving Resistance Problems
11.0.0 Applying Ohm's Law
12.0.0 Kirchhoff's Laws
12.1.0 Kirchhoff's Current Law
12.2.0 Kirchhoff's Voltage Law
12.3.0 Loop Equations

WEBINAR S3W2 NFPA 2013 Chapter 17.12, 17.13, 17.14, 17.15, 17.16

S3W3 – AC Circuits Part I
Module 33202-05
New Module 33302-10
1.0.0 Introduction
2.0.0 Sine Wave Generation
3.0.0 Sine Wave Terminology
3.1.0 Frequency
3.2.0 Wavelength
3.3.0 Peak Value
3.4.0 Average Value
3.5.0 Root-Mean-Square or Effective Value
4.0.0 AC Phase Relationships
4.1.0 Phase Angle
4.2.0 Phase Angle Diagrams

WEBINAR S3W3 NFPA 2013 Chapter 18.4

S3W4 – AC Circuits Part II
Module 33202-05
New Module 33302-10

5.0.0 Nonsinusoidal Waveforms
6.0.0 Resistance in AC Circuits
7.0.0 Inductance in AC Circuits
7.1.0 Factors Affecting Inductance
7.2.0 Voltage and Current in an Inductive AC Circuit
7.3.0 Inductive Reactance
8.0.0 Capacitance
8.1.0 Factors Affecting Capacitance
8.2.0 Calculating Equivalent Capacitance
8.3.0 Capacitor Specifications
8.3.1 Voltage Rating
8.3.2 Leak Resistance
8.4.0 Voltage and Current in a Capacitive AC Circuit
8.5.0 Capacitive Reactance
9.0.0 RL, RC, LC and RLC Circuits
9.1.0 RL Circuits
9.1.1 Series RL Circuit
9.1.2 Parallel RL Circuits

WEBINAR S3W4 NFPA 2013 Chapter 18.4 cont.

S3W5 – AC Circuits Part III
Module 33202-05
New Module 33302-10

9.2.0 RC Circuits
9.2.1 Series RC Circuit
9.2.2 Parallel RC Circuit
9.3.0 LC Circuits
9.3.1 Series LC Circuit
9.3.2 Parallel LC Circuit
9.4.0 RLC Circuits
9.4.1 Series RLC Circuit
9.4.3 Parallel RLC Circuit
10.0.0 Power in AC Circuits
10.1.0 True Power
10.2.0 Apparent Power
10.3.0 Reactive Power
10.4.0 Power Factor
10.5.0 Power Triangle
11.0.0 Transformers

11.1.0 Transformer Construction
11.2.0 Operating Characteristics
11.2.1 Energized with No Load
11.3.0 Turns and Voltage Ratios
11.4.0 Types of Transformers
11.5.0 Transformer Selection

WEBINAR S3W5 NFPA 2013 Chapter 18.5

S3W6 – Semiconductors and Integrated Circuits Part I
Module 33203-05
New Module 33204-10

1.0.0 Introduction
2.0.0 Semiconductor Fundamentals
2.1.0 Conductors
2.2.0 Insulators
2.3.0 Semiconductors
3.0.0 Diodes
3.1.0 Rectifiers
3.2.0 Diode Identification
4.0.0 Light-Emitting Diodes
5.0.0 Photo Diodes
6.0.0 Zener Diodes
7.1.0 NPN Transistors
7.2.0 PNP Transistors
7.3.0 Identifying Transistor Leads
7.4.0 Field-Effect Transistors
8.0.0 Silicon-Controlled Rectifiers
9.0.0 Diacs
10.0.0 Triacs
11.0.0 Printed Circuit Boards
11.1.0 Integrated Circuits
11.2.0 Microprocessors
11.3.0 Diagnostic Capability
11.4.0 Electrostatic Discharge Sensitivity
12.0.0 Operational Amplifiers

WEBINAR S3W6 NFPA 2013 Chapter 18.5 cont., 18.6

S3W7 – Semiconductors and Integrated Circuits Part II
Module 33203-05
New Module 33204-10

13.0.0 Basic Digital Gates

13.1.0 AND Gates
13.2.0 OR Gates
13.3.0 Amplifier
13.4.0 Inverter
13.5.0 NAND Gate
13.6.0 NOR Gate
13.7.0 Exclusive OR Gate

WEBINAR S3W7 No Class. Midterm and Lab

Midterm Lab Schedule

1. Practical application of test equipment including Digital and Analog Volt/Ohm meter, and Ammeter
2. Practical identification and measuring of resistors, diodes, LEDS, transformers, Transistors
3. Midterm Review
4. Midterm Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 2 Textbook

S3W8 –Test Equipment
Module 33204-05
New Module 33205-10

1.0.0 Introduction
2.0.0 Conventional Meters
2.1.0 Ammeter
2.2.0 Voltmeter
2.3.0 Ohmmeter
2.4.0 Multimeters
3.0.0 Digital Meters
3.1.0 Features
3.2.0 Operation
3.3.0 Maintenance
4.0.0 Continuity Tester
5.0.0 Voltage Tester
6.0.0 Oscilloscopes
7.0.0 Wattmeter
8.0.0 Megohmmeter
9.0.0 Line Frequency Meter
10.0.0 Power Factor Meter
11.0.0 Recording Instruments
12.0.0 Lineman's Test Set

13.0.0 Cable Toner
14.0.0 Cable Certification Testers
15.0.0 Sound Pressure Level Meters
16.0.0 RF Power Meter
17.0.0 Signal Level Meter
18.0.0 Time-Domain Reflectometer
19.0.0 Spectrum Analyzers
20.0.0 Signal Generators
21.0.0 Category Ratings
22.0.0 Testing and Troubleshooting
23.0.0 Test Equipment Safety

WEBINAR S3W8 NFPA 2013 Chapter 18.7, 18.8, 18.9, 18.10, 18.11

S3W9 – Power Quality and Grounding Part I
Module 33205-05
New Module 33210-10
1.0.0 Introduction
2.0.0 Premises Wiring
2.1.0 Characteristics of AC Power
3.0.0 Overview of Premises Electrical System Grounding
3.1.0 Grounding System Terminology
3.2.0 General NEC® Grounding Requirements
3.3.0 System and Equipment Grounding

WEBINAR S3W9 NFPA 2013 Chapter 21.1, 21.2, 21.3

S3W10 – Power Quality and Grounding Part II
Module 33205-05
New Module 33210-10

4.0.0 Causes of Poor AC Power Quality
4.1.0 Voltage Transients and Surges
4.2.0 Voltage Swells and Sags
4.3.0 Overvoltage and Undervoltage
4.4.0 Voltage Interruptions
4.5.0 Frequency Variations
4.6.0 Harmonics
4.7.0 Noise Electromagnetic Interference
5.0.0 Power System Protection and Conditioning Equipment
5.1.0 Power Filters and Regulators
5.1.1 Isolation Transformers
5.1.2 Surge Protecting Devices
5.1.3 Voltage Regulators
5.1.4 Power Line Conditioners

5.1.5 Harmonic and Noise Suppression Filters
5.2.0 Engine-Generator Backup Power Sets
5.3.0 Static Uninterruptible Power Supply
5.3.1 Double-Conversion UPS Systems
5.3.2 Single-Conversion UPS Systems

WEBINAR S3W10 NFPA 2013 Chapter 21.4

S3W11 – Power Quality and Grounding Part III
Module 33205-05
New Module 33210-10

6.0.0 Direct Current Power
6.1.0 DC Power Supplies
6.1.1 Linear Power Supplies
6.1.2 Nonlinear Power Supplies
6.1.3 Selecting a Power Supply
6.1.4 Power Supply Testing
6.2.0 Battery and Battery Charger Operation
7.0.0 Cable Shielding and Grounding Techniques used to Minimize EMI
7.1.0 Cable Shields
7.2.0 Preventing Ground Loops

WEBINAR S3W11 NFPA 2013 Chapter 21.4 cont., 21.5, 21.6

S3W12 –Electrical Drawings Part I
Module 33206-05
New Module 33206-11

1.0.0 Introduction
1.1.0 Site Plans
1.2.0 Floor Plans
1.3.0 Elevations
1.4.0 Sections
1.5.0 Electrical Drawings
2.0.0 Drawing Layout
2.1.0 Title Block
2.2.0 Approval Block
2.3.0 Revision Block
3.0.0 Drafting Lines
3.1.0 Electrical Drafting Lines
4.0.0 Electrical Symbols

WEBINAR S3W12 NFPA 2013 Chapter 21.7

S3W13 –Electrical Drawings Part II
New Module 33206-11

5.0.0 Scale Drawings
5.1.0 Architect's Scale
5.2.0 Engineer's Scale
5.3.0 Metric Scale
6.0.0 Analyzing Electrical Drawings
6.1.0 Development of Site Plans
7.0.0 Typical Site Electrical Plan
8.0.0 Power Plans
8.1.0 Key Plan
8.2.0 Symbol List
8.3.0 Floor Plan
9.0.0 Special Electrical Systems Plans

WEBINAR S3W13 NFPA 2013 Chapter 21.7 cont., 21.8, 21.9, 21.10

S3W14– Electrical Drawings Part III
Module 33206-05
New Module 33206-11

10.0.0 Electrical Details and Diagrams
10.1.0 Riser Diagrams
10.2.0 Wiring Diagrams
10.2.1 Point-to-Point Method
10.2.2 Cable Method
10.2.3 Baseline Method
10.2.4 Lineless (Wireless) Method
10.3.0 Schematics
10.4.0 Drawing Details
11.0.0 Written Specifications
11.1.0 How Specifications are Written
11.2.0 Format of Specifications
12.0.0 Quality Takeoffs
13.0.0 As-Built Drawings

WEBINAR S3W4 No Class. Final and Lab

Final Lab Schedule

1. Practice reading blueprints from various trades

2. Application of 3rd semester content and how it impacts fire alarms
3. Final Exam Review
4. Final Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 2 Textbook
4. Multimeters and a small selection of diodes, resistors and 10 feet of 2 conductor cable
5. LEDs
6. Transformers and transistors for the practice exercises

Fourth Semester

11 WEEKS 66 HOURS

OLD WAS 14 WEEKS 84 HOURS

Midterm and Final Exam = 16 in class LAB HOURS

9 Webinars @ one hour = 9 HOURS

S4W1 – Switching Devices and Timers Part I
Module 33207-05
New Module 33203-10

1.0.0 Introduction
2.0.0 Switches
2.1.0 Switch Classifications
2.1.1 Switch Contacts
2.1.4 Typical Switch Wiring
2.2.0 Switch Descriptions
3.0.0 Photoelectric Devices
3.1.0 Photocell Switches
3.2.0 Solar Cells
3.3.0 Infrared Devices
3.3.1 Motion Detectors
3.4.0 Fiber-Optic Switching Devices
4.0.0 Proximity Sensors

WEBINAR S4W1 NFPA 2013 Chapter 23.1, 23.2, 23.3

S4W2 – Switching Devices and Timers Part II
Module 33207-05
New Module 33203-10

5.0.0 Electrical Relays

5.1.0 Electromechanical Relays
5.1.1 Reed Relays and Switches
5.1.2 General-Purpose Relays
5.1.4 Magnetic Relay Testing
5.2.0 Solid State Relays
5.2.1 Comparison of Electromechanical and Solid-State Relays
5.2.2 Connecting SSRs to Achieve Multiple Outputs
5.2.3 SSR Temperature Considerations
5.2.4 Solid-State Relay Overvoltage and Overcurrent Protection

WEBINAR S4W2 NFPA 2013 Chapter 23.4, 23.5, 23.6, 23.7

S4W3– Switching Devices and Timers Part III
Module 33207-05
New Module 33203-10

6.0.0 Timers
6.1.0 Synchronous Time Switches
6.2.0 Solid State Timers
6.3.0 Programmable Electronic Time Switches

WEBINAR S4W3 NFPA 2013 Chapter 23.8

S4W4– Wire and Cable Terminations Part I
Module 33208-05
New Module 33209-10
1.0.0 Introduction
2.0.0 Coaxial Cable Terminations
2.1.0 Types of Coaxial Connections
2.2.0 Coaxial Cable Management
2.3.0 Termination of Coaxial Cable
2.3.1 Preparing the Cable End
2.3.2 Applying a BNC Connector
2.3.3 Applying an F-Type Connector
2.3.4 Applying an RCA Connector
2.4.0 Coaxial Cable Testing

WEBINAR S4W4 NFPA 2013 Chapter 23.8 cont.

S4W5 – Wire and Cable Terminations Part II
Module 33208-05
New Module 33209-10

3.0.0 Terminating UTP Cable

3.1.0 Types of UTP Connectors
3.2.0 UTP Cable Management
3.2.1 Check for Proper Cable Routing, Writing Scheme, and Compatible Equipment
3.2.2 Form and Dress Cables at Consolidation Points or Cross-Connect Panels
3.2.3 Determine the Length and Slack Required for Cables
3.2.4 Using Proper Cable Management Hardware
3.3.0 Typical Consolidation Point or Cross-Connect Block Termination Procedures
3.3.1 Typical Type 66 Block Termination Procedures

WEBINAR S4W5 NFPA 2013 Chapter 23.8 cont.

Midterm Lab Schedule

1. Identify and select various types of switches for the specific applications
2. Select an electromechanical relay and build a holding circuit
3. Build a simple circuit using a photocell or motion detector
4. Terminating and Testing Coaxial Cable
5. Terminating UTP Cable
6. Terminating Type 110 Blocks
7. Modular Plug/Cord Fabrication and Termination
8. Midterm Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 2 Textbook
4. Multimeters
5. Hand tools for terminating UTP cables (cable and jacks)
6. Two types of switches (be prepared to explain their style and how they function)

S4W6– Wire and Cable Terminations Part III
Module 33208-05
New Module 33209-10

3.4.0 Typical Type 110 Block Termination Procedures
3.5.0 Typical Workstation Coupler or Modular Jack Termination
3.6.0 Typical Surface-Mount Box Termination Procedure
3.7.0 Modular Plug/Cord Fabrication and Termination Procedures
3.8.0 Patch Cord and 110 Block Plug Termination Procedures
3.9.0 Testing Twisted-Pair Cable

WEBINAR S4W6 No Class. Mid Term and Lab

S4W7– Wire and Cable Terminations Part IV
Module 33208-05
New Module 33209-10

- 4.0.0 Solderless Connections
- 4.1.0 Crimp Connectors for Screw Terminals
- 4.2.0 Splice-Type Crimp Connections
- 4.3.0 Wire Nuts
- 4.4.0 Cable/Conductor Routing and Inspection Considerations
- 4.5.0 Termination of Conductors/Cables to Solderless Connectors
- 4.5.1 Conductor Preparation
- 4.5.2 Crimping Tools
- 4.5.3 Crimping Procedure
- 4.5.4 Termination Inspection
- 4.5.5 Terminal Block Connections
- 4.6.0 Terminating Typical Shielded Cable
- 5.0.0 Solder-Type Connectors
- 5.1.0 Solder
- 5.2.0 Soldering Flux
- 5.3.0 Soldering Irons
- 5.4.0 The Soldering Process
- 5.4.1 Preparing the Soldering Iron
- 5.4.2 Soldering Printed Circuit Board Mounted Components
- 5.4.4 Desoldering Wires and Components
- 5.5.0 Soldering Safety
- 5.6.0 Terminating an RCA Connector
- 5.7.0 Terminating an XLR Connector
- 6/0/0 Optical Fiber Cable Connectors
- 7.0.0 Legacy Communications Connectors and Terminations

WEBINAR S4W7 NFPA 2013 Chapter 23.9 through 23.18

S4W8 – Cable Selection Part I
Module 33301-04
New Module 33208-10

- 1.0.0 Introduction
- 1.1.0 Low-Voltage Cable Conductors and Insulation
- 2.0.0 Common Factors in Cable Selection
- 2.1.0 Type of Installation
- 2.2.0 Length of Cable run
- 2.3.0 Cable Installation

3.0.0 Fire Alarm and Security System Cabling
4.0.0 Coaxial Cable Selection
5.0.0 Telecommunications and Data Cable

WEBINAR S4W8 NFPA 2013 Chapter 24.1, 24.2, 24.3

S4W9– Cable Selection Part II
Module 33301-04
New Module 33208-10

6.0.0 Optical Multi-Fiber Cables
7.0.0 Conductor Voltage Drop
7.1.0 Sequential Voltage Drop Method
7.2.0 Load Center Voltage Drop Method
7.3.0 End-Load Voltage Drop Method
7.4.0 Load Current Wire Selection Tables
8.0.0 Coaxial Cable Voltage Drop
9.0.0 Speaker Cable Power Drop
9.1.0 Direct-Couples Speaker Systems
9.2.0 Distributed Constant-Voltage Speaker Systems
9.3.0 Distributed Amplifier/Direct- Coupled Speaker Systems

WEBINAR S4W9 NFPA 2013 Chapter 24.4

S4W10 – Introduction to Codes and Standards Part I
Module 33209-05
1.0.0 Introduction
2.0.0 The Purpose of Codes and Standards
2.1.0 Codes
2.2.0 Standards
3.0.0 Determining Which Codes and Standards to Follow
4.0.0 Words with Special Meanings Used in Codes and Standards
5.0.0 Code Deviations and Conflicts

WEBINAR S4W10 NFPA 2013 Chapter 24.5, 24.6, 24.7

S4W11– Introduction to Codes and Standards Part II
Module 33209-05
6.0.0 *National Electrical Code*® (NFPA 70)
7.0.0 *National Fire Alarm and Signaling Code*® (NFPA 72)
8.0.0*Life Safety Code*® (NFPA 101)
9.0.0 Related NFPA Codes
10.0.0 Building Codes
11.0.0 ANSI/TIA/EIA Telecommunications Related Standards

12.0.0 Related Standards
13.0.0 Testing Laboratories
13.1.0 Nationally Recognized Testing Laboratories
13.2.0 National Electrical Manufacturers Association

WEBINAR S4W11 No Class. Final and Lab

Final Lab Schedule

1. Practice Preparing Solderless Connections
2. Practice Preparing Soldered Connections
3. Use of Megger, Cable Toner and Sound Level Meter
4. Final Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 2 Textbook
4. Solder and solder iron and wire with which to practice
5. Safety glasses
6. NEC (NFPA 72)

Fifth Semester

13 WEEKS 78 HOURS

OLD WAS 14 WEEKS 84 HOURS

Midterm and Final Exam = 16 in class LAB HOURS

7 Webinars @ one hour = 7 HOURS

S5W1 – Buses and Networks Part I
Module 33302-04
New

1.0.0 Introduction
2.0.0 The Data Highway
2.1.0 Serial Communication
2.1.1 Universal Serial Bus (USB)
2.1.2 FireWire
2.1.3 RS-232, RS-422, and RS-485
2.2.0 Parallel Communication
2.3.0 Data Buses
3.0.0 Transfer Medium
4.0.0 OSI Reference Model
5.0.0 Connections to Transfer Medium
6.0.0 Network Topologies

6.1.0 Star Topology
6.2.0 Ring Topology
6.3.0 Bus Topology
6.4.0 Hybrid Topology
7.0.0 Network Access Control
7.1.0 Random Access
7.2.0 Polling
7.3.0 Dedicated Channel
7.5.0 Token Passing
8.0.0 Network Security
8.1.0 Firewalls
8.2.0 Antivirus Software

WEBINAR S5W1 NFPA 2013 Chapter 26.1, 26.2, 26.3

S5W2 – Buses and Networks Part II
Module 33302-04

9.0.0 The Internet
9.2.0 Transmission Control Protocol/Internet Protocol (TCP/IP
9.2.1 Internet Protocol (IP)
9.2.2 IP Addressing
9.2.3 Transmission Control Protocol (TCP)
9.3.0 Internet Application Protocols
9.3.1 Hypertext Transfer Protocol
9.3.2 Simple Mail Transfer Protocol
9.3.3 Post Office Protocol
9.3.4 Internet Mail Access Protocol
9.3.5 Network News Transfer Protocol
9.3.6 File Transfer Protocol

WEBINAR S5W2 NFPA 2013 Chapter 26.4

S5W3– Buses and Networks Part III
Module 33302-04

10.0.0 Ethernet
11.0.0 Microcomputer-Based Local Area Networks (LANs)
11.1.0 Basic Input/Output System (BIOS)
11.2.0 Operating Systems
11.3.0 Networking Software/Networking Operating Systems
11.4.0 Real-Time Performance Issues
12.0.0 Routers, Bridges, and Gateways
12.1.0 Routers
12.2.0 Bridges
12.3.0 Gateways

12.4.0 Repeaters
13.0.0 Addressable Systems
14.0.0 Power Line Carrier Systems
15.0.0 Power Over Ethernet (POE) Systems

WEBINAR S5W3 NFPA 2013 Chapter 26.5

S5W4 – Fiber Optics
Module 33303-04
New Module 33302-11
1.0.0 Introduction
1.1.0 Benefits
1.2.0 Applications
2.0.0 Fiber Optics Theory
2.1.0 Light Generation and Coupling
2.2.0 Light Transmission
2.3.0 Operational Considerations
2.3.1 Speed and Capacity
2.3.2 Alignment
3.0.0 Fiber-Optic Components
3.1.0 Optical Fiber
3.2.0 Cabling
3.3.0 Types of Cables
3.3.1 Indoor Cables
3.3.2 Outdoor Cables
3.4.0 Cable Characteristics
4.0.0 Understanding Light Transmission
4.1.0 Signal Types
4.2.0 Speed
4.3.0 Operating Wavelengths
4.4.0 Types of Light Sources
4.4.1 LEDs
4.4.2 Laser Diodes
5.0.0 Receivers
5.1.0 Basic Receiver Elements
5.2.0 Speed
6.0.0 Connectors, Couplers and Splices
6.1.0 Connectors and Splices
6.2.0 Connector Requirements
6.3.0 Causes of Connection Losses
6.3.1 Intrinsic Factors
6.3.2 Extrinsic Factors
6.3.3 System-Related Factors
6.4.0 Splices
6.5.0 Splitters

6.5.1 Basic Splitter Theory
6.5.2 Splitter Configurations
6.5.5 Active Splitters
6.5.6 Optical Switches

WEBINAR S5W4 No Class. Lab and Midterm.

S5W5 – Fiber Optics Part II
Module 33303-04

7.0.0 Installation
7.1.0 Direct Burial Installation
7.2.0 Aerial Installation
7.3.0 Indoor Installation
7.4.0 Tray and Duct Installation
7.5.0 Conduit Installation
7.7.0 Pulling Fiber-Optic Cables
7.8.0 Enclosures and Organizers
7.9.0 Distribution Hardware
8.0.0 Terminating Optical Fiber Cable
8.1.0 Mechanical Considerations
8.2.0 Basic Connector Structure
8.3.0 Connector Installation
9.0.0 Splicing
9.1.0 Applications of Fiber Splices
9.2.0 Types of Splicing
9.2.1 Fusion Splicing
9.2.2 Mechanical Splicing
9.3.0 Splicing Issues
10.0.0 Fiber Optic Testing
10.1.0 Optical Power Meter
10.2.0 Insertion Loss Testing and Mode Control
10.3.0 Fiber Loss Measurements
10.4.0 Time and Frequency Domains
10.5.0 Optical Time Domain Reflectometry

WEBINAR S5W5 NFPA 2013 Chapter 26.6

S5W6 - Wireless Communication Part I
Module 33305-04
New Module: 33303-11

1.0.0 Introduction
2.0.0 Wireless Communication Principles
2.1.0 Modulation
2.2.0 Analog and Digital Signals
2.3.0 Multiplexing

3.0.0 Radio Frequency (RF) Systems
3.1.0 Transmitters
3.2.0 Receivers
3.3.0 Transceivers
3.4.0 Repeaters
3.5.0 Voltage Standing Wave Ratio (VSWR)
3.6.0 Waveguide

WEBINAR S5W6 NFPA 2013 Chapter 26.6 cont.

S5W7– Wireless Communication Part II
Module 33305-04

4.0.0 Infrared (IR) Systems
4.1.0 Basic IR Components
4.2.0 Remote Control Circuits
4.3.0 Remote Control Distribution Systems
4.4.0 RS-232 Data Transmission Interface Systems
4.5.0 IR Beam-Break Alarm Systems
5.0.0 Wireless Computer Networks
5.1.0 Background
5.2.0 Wireless LAN Equipment
5.3.0 Wireless Network Security
5.4.0
5.5.0 Background
6.0.0 Satellite Communications
6.1.0 Satellite System Overview
6.2.0 Areas of Service
6.3.0 Satellite Orbits
7.0.0 Test Equipment
7.1.0 RF Field Strength Analyzer
7.2.0 RF Analyzer/Standing Wave Meter
7.3.0 Power Meter
8.0.0 Antenna Installation
9.0.0 Noise/Electromagnetic Interference

WEBINAR S5W7 NFPA 2013 Chapter 27.1, 27.2, 27.3, 27.4

MIDTERM LAB

1. Lab: Determining the correct gauge wire for specific wire lengths at specific voltages and loads. Identify the proper cable to be used for an application. Demonstrate their understanding of cable markings.
2. Lab: Demonstrate the installation of fiber-optic cabling and support equipment.
3. Lab: Review / Demonstrate simple computer network components.

4. Lab: Review / Demonstrate simple X-10 (PLC) applications.
5. Lab: Demonstrate proper method of striping coaxial cable and installing connectors.
6. Mid-Term Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 3 Textbook

S5W8– Site Survey, Project Planning and Documentation Part I
Module 33306-04
New Module 33304-11

1.0.0 Introduction
2.0.0 The Job Estimating and Bidding Process
2.1.0 Management Decision to Bid
2.2.0 The Estimating Process
2.3.0 Completing the Estimate
2.4.0 Management Approval
2.5.0 Preparing and Submitting the Bid
3.0.0 Review of Job Requirements
3.1.0 Construction Drawings
3.2.0 Specifications
3.3.0 Scope of Work
3.4.0 Exclusions
4.0.0 Job Planning After the Contract Award
5.0.0 New Construction Site Survey, Planning and Documentation
6.0.0 Scheduling the Work

WEBINAR S5W8 NFPA 2013 Chapter 27.5, 27.6, 27.7, 27.8

S5W9 – Site Survey, Project Planning and Documentation Part II
Module 33306-04
New Module 33304-11

7.0.0 Acquiring the Needed Materials/Equipment
8.0.0 Assigning the Installation Crew
9.0.0 Completing the Installation
10.0.0 Incorporating Quality Control/Acceptance Test
11.0.0 Completing the Punch List
12.0.0 Completing the Job
13.0.0 Retrofitting Installations
13.1.0 Planning Retrofit Installations
13.2.0 Performing the Site Survey

14.0.0 Additional Documentation
14.1.0 Addenda
14.2.0 Liens
14.3.0 Stop Work Orders
14.4.0 Request For Information (RFI)
14.5.0 Change Orders
14.6.0 Project Logs
14.7.0 Certificates of Completion
14.8.0 Operation and Maintenance Manuals

WEBINAR S5W9 NFPA 2013 Chapter 29.1, 29.2, 29.3

S5W10– Introductory Skills for the Crew Leader Part I
Module 33308-04

2.0.0 The Shift in Work Activities
3.0.0 Becoming a Leader
3.1.0 Characteristics of Leaders
3.2.0 Functions of a Leader
3.3.0 Leadership Styles
3.4.0 Ethics in Leadership
4.0.0 Communication
4.1.0 Verbal Communication
4.2.0 Non-Verbal Communication
4.3.0 Written or Visual Communication
4.4.0 Communication Issues
5.0.0 Motivation
5.1.0 Employee Motivators
5.2.0 Motivating Employees
6.0.0 Team Building
6.1.0 Successful Teams
6.2.0 Building Successful Teams
7.0.0 Getting the Job Done
7.1.0 Delegating Responsibilities
7.2.0 Implementing Policies and Procedures
8.0.0 Problem Solving and Decision Making
8.1.0 Problem Solving vs. Decision Making
8.2.0 Types of Decisions
8.3.0 Formal Problem-Solving Techniques
8.4.0 Special Leadership Problems

WEBINAR S5W10 NFPA 2013 Chapter 29.4, 29.5

S5W11– Introductory Skills for the Crew Leader Part II
Module 33308-04

1.0.0 Project Control Overview

1.1.0 Construction Projects
2.0.0 Project Delivery Systems
2.1.0 General Contracting
2.2.0 Design-Build
2.3.0 Construction Management
3.0.0 An Overview of Planning
3.1.0 What is Planning?
3.2.0 Way Plan?
4.0.0 Stages of Planning
4.1.0 Pre-Construction Planning
4.2.0 Construction Planning
5.0.0 The Planning Process
5.1.0 Establishing a Goal
5.2.0 Identifying the Work to be Done
5.3.0 Determining Tasks
5.4.0 Communicate Responsibilities
5.5.0 Follow-Up
6.0.0 Planning Resources
6.1.0 Panning Materials
6.2.0 Planning Equipment
6.3.0 Planning Tools
6.4.0 Panning Labor
7.0.0 Ways to Pan
8.0.0 Estimating
8.1.0 The Estimating Process
10.0.0 Cost Awareness and Control
10.1.0 Categories of Control
10.2.0 Field Reporting System
10.3.0 Supervisor's Role in Cost Control

WEBINAR S5W11 NFPA 2013 Chapter 29.6, 29.7

S5W12 System Commissioning and User Training –
Module 33409-03

1.0.0 Introduction
2.0.0 Commissioning Process Overview
2.1.0 Pre-Installation Activities
2.2.0 Commissioning Plan Preparation
2.3.0 Installation Activities
2.4.0 Functional Performance Testing Activities
2.5.0 User Training and Documentation
2.6.0 System Acceptance
2.7.0 Post-Acceptance Activities
3.0.0 User Training
3.1.0 Determining the Scope of the Training

3.2.0 Instructor Preparation
3.3.0 Trainee Qualifications
3.4.0 Equipment/System Preparation
3.5.0 Conduct of the Training
3.6.0 On-The-Job Training
3.7.0 Course Closure

WEBINAR S5W12 NFPA 2013 Chapter 29.8, 29.9, 29.10, 29.11

S5W13 Maintenance and Repair –
Module 33307-04

1.0.0 Introduction
2.0.0 Maintenance versus Repair
3.0.0 Causes of Failures
3.1.0 Environmental Conditions
3.2.0 Improper Installations
3.3.0 Poor Power Quality
3.4.0 Electrostatic Discharge
3.5.0 Operator Error
4.0.0 Test Equipment
5.0.0 Common Causes of Electrical Equipment Faults
5.1.0 Short Circuits
5.2.0 Open Circuits
5.3.0 Ground Faults
5.4.0 Mechanical Failures
6.0.0 Using a Systematic Approach to Troubleshooting
7.0.0 Customer Interface
8.0.0 Physical Examination of the System
9.0.0 Basic System Analysis
10.0.0 Use of Manufacturers' Troubleshooting Aids
10.1.0 Wiring Diagrams
10.2.0 Troubleshooting Tables and Fault Isolation Diagrams
10.3.0 Diagnostic Equipment and Tests
11.0.0 Fault Isolation in the System/Unit Problem Area
11.1.0 Troubleshooting Input Power and Power Supply Circuits
11.2.0 Troubleshooting Control/Sensor Circuits
11.3.0 Troubleshooting Central Processing Equipment
11.4.0 Troubleshooting Computer-Related Problems
11.5.0 Troubleshooting and Testing Copper Cable
11.6.0 Troubleshooting and Testing Fiber-Optic Cable
11.7.0 Testing after Repair
12.0.0 Preventive Maintenance
12.1.0 Inspection
12.2.0 Cleaning
12.3.0 Lubrication

12.4.0 Testing and Adjustment
13.0.0 Inspection and Testing Forms

WEBINAR S5W13 No Class. Final and Lab

Final Lab Schedule

1. Lab: Installing a wireless computer network
2. Lab: Review sample specifications, contracts and construction drawings for the installation of a low-voltage system
3. Lab: Review / demonstrate simple wireless computer network components
4. Lab: Review basic components of CCTV system / DVR / software
5. Lab: Communications (verbal / non-verbal)
6. Final Exam Review
7. Final Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 3 Textbook

Sixth Semester
12 WEEKS -72 HOURS
OLD WAS 14 WEEKS 84 HOURS
Midterm and Final Exam = 16 in class LAB HOURS
10 Webinars @ one hour =10 HOURS

S6W1 – Intrusion Detection Systems Part I
Module 33402
New Module: 33407-12

1.0.0 Introduction
2.0.0 Intrusion System Overview
2.1.0 Local
2.2.0 Monitored
2.3.0 Types
3.0.0 Types of Intrusion System Sensors
3.1.0 Perimeter
3.2.0 Interior
4.0.0 Annunciation (Notification) Devices
4.1.0 Strobes
4.2.0 Bells, Buzzers, Horns, Chimes and Sirens
4.3.0 Voice Messages
5.0.0 Control Panels

5.1.0 Control Units and Combination Systems
5.2.0 Operating Panels (Control Points)
5.3.0 Control Unit/Panel Circuit Labeling
5.4.0 Types of Control Unit Outputs
6.0.0 Communications and Monitoring
6.1.0 Communications Options
6.2.0 Monitoring Options
6.3.0 Communications Methods and Systems

WEBINAR S6W1 NFPA 2013 Chapter 14.1, 14.2

S6W2– Intrusion Detection Systems Part II
Module 33402
New Module: 33407-12

7.0.0 System Design
7.1.0 Applications
7.2.0 Methods for Connection
7.3.0 UL Requirements
7.4.0 False Alarm Prevention and False Alarm Control Teams (FACT)

WEBINAR S6W2 NFPA 2013 Chapter 14.3

S6W3 – Intrusion Detection Systems Part III
Module 33402
New Module: 33407-12

8.0.0 General Installation Guidelines
8.1.0 General Wiring Requirements
8.2.0 Workmanship
8.3.0 Access
8.4.0 Circuit Identification
8.5.0 Power-Limited Circuits in Raceways
8.6.0 Mounting of Detector Assemblies
8.7.0 Outdoor Wiring
8.8.0 Fire-Stopping
8.9.0 Air-Handling Spaces
8.10.0 Hazardous Spaces (SME Note: Same as above.)
8.11.0 Wet and Corrosive Environments
8.12.0 Underground
8.13.0 Remote Control Signaling Circuits
8.14.0 Wiring Protection
8.15.0 Cables Floor to Floor
8.16.0 Cables in Raceways
8.17.0 Raceways – Cable Support

8.18.0 Cable Spacing
8.19.0 Elevator Shafts
8.20.0 Wiring Methods
8.21.0 Primary Power
8.22.0 Secondary Power
8.23.0 Grounding
9.0.0 System and Equipment Guidelines
9.1.0 Minimum Secondary Power
9.2.0 Control Units
9.3.0 Perimeter Sensors
9.4.0 Perimeter Fence or Exterior Detection Systems

WEBINAR S6W3 NFPA 2013 Chapter 14.4

S6W4– Intrusion Detection Systems Part IV
Module 33402
New Module: 33407-12

9.5.0 Interior Intrusion systems
10.0.0 Programming Options
10.1.0 Controlled and 24-Hour Zones
10.2.0 Entry and Exit Delays
10.3.0 Delayed and Instant Zones
10.4.0 Perimeter and Interior Zones
10.5.0 Home and Away Feature
10.6.0 Interior Follower Zones
10.7.0 Panic, Duress, Medical and Fire Zones
11.0.0 Inspection, Testing and Maintenance
11.1.0 Purpose of Testing
11.2.0 Before Testing
11.3.0 Precautions for Occupied Buildings
11.4.0 Definitions
11.5.0 Testing Methodology
11.6.0 After Testing
12.0.0 Intrusion System Troubleshooting Guidelines

WEBINAR S6W4 NFPA 2013 Chapter 14.4

S6W5 - CCTV Systems
Module 33405-03
New Module: 33410-12

1.0.0 Introduction
2.0.0 CCTV System Overview
2.1.0 A Typical CCTV System
2.2.0 Multiple Cameras with a Switcher
2.3.0 Multiple Cameras with a Splitter

2.4.0 Multiple Cameras with a Multiplexer
2.5.0 Use a Video Recorder to Archive Video
3.0.0 CCTV Technology
3.1.0 Digital vs. Analog
3.2.0 Review of Internet Protocola
3.3.0 Client-Server CCTV for the Internet Age
3.4.0 Recording and Retrieving Network Data
3.5.0 Factors that Affect Digital CCTV
3.6.0 Monitoring Video in a Digital CCTV System
3.7.0 Network and User Authentication
3.8.0 Encryption and Decryption
4.0.0 CCTV System Components
4.1.0 Cameras
4.2.0 The Camera Lens
4.3.0 Camera Mounts and Housings
4.4.0 Date and Time Generators
4.5.0 Controllers
4.6.0 Alarm Interface Units
4.7.0 Motion Detectors
4.8.0 CCTV Keyboards
4.9.0 Recorders-Controllers
4.10.0 Video Monitors
5.0.0 Signal Distribution
6.0.0 Power Sources
7.0.0 Lighting and Illumination
8.0.0 Medium to Large CCTV Systems
9.0.0 Testing CCTV System Video

WEBINAR S6W5 NFPA 2013 Chapter 14.4

S6W6 Access Control Systems
Module 33407-03

1.0.0 Introduction
2.0.0 Entry and Access Control Systems
2.1.0 Typical Non-Staffed Entry Control System
2.2.0 Non-Staffed Entry Control System Considerations
2.3.0 Access Control Systems
2.4.0 Coded Credentials
3.0.0 Controllers and Power Supplies
4.0.0 Entry/Exit Readers
4.1.0 Swipe, Insert and Proximity Readers
4.2.0 Biometric Readers
5.0.0 Locking Devices and Accessories
5.1.0 Electric Strikes

5.2.0 Electric Bolt Locks
5.3.0 Electric Locksets (Latches)
5.4.0 Electromagnetic Locks
5.5.0 Delayed Exit Alert Locks
5.6.0 Exit Switches
5.7.0 Exit Door Accessories
5.8.0 Cable Supervision
6.0.0 Entry Control Barriers
6.1.0 Gates
6.2.0 Turnstiles and Rotary Security Doors
6.3.0 Mantraps
6.4.0 Doors
7.0.0 Installation Guidelines
7.1.0 Installation Tips
7.2.0 Installation Procedures

WEBINAR S6W6 No Class. Midterm and Lab

Midterm Lab Schedule

1. Review of proper test and inspection procedures. Review of NFPA test and inspection form.
2. Outline of final assignment requirements (test and inspection at one of your customer's sites)
3. Midterm Review
4. Midterm Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 4 Textbook
4. 2014 Edition NFPA 70, the National Electric Code (if possible)
5. 2016 Edition NFPA 72, the National Fire Alarm Code, without the California Amendments (if possible)

S6W7 Fire Alarm Systems Part I
Module 33401-03

1.0.0 Introduction
3.0.0 Fire Alarm System Overview
3.1.0 Fire Alarm Circuit Designations
3.2.0 Types of Fire Alarm Systems
4.0.0 Fire Alarm System Equipment
2.0.0 The National Fire Protection Association (NFPA)
2.1.0 NFPA 72® - Introduction
2.3.1 Fundamentals
2.3.2 Protected Premises

WEBINAR S6W7 NFPA 2013 Chapter 14.5, 14.6

S6W8 Fire Alarm Systems Part II
Module 33401-03

- 5.0.0 Fire Alarm Initiating Devices
- 5.1.0 Conventional versus Addressable Commercial Detectors
- 5.2.0 Automatic Detectors
- 5.3.0 Heat Detectors
- 5.4.0 Smoke Detectors
- 5.5.0 Other Types of Detectors
- 5.6.0 Manual Fire Alarm Boxes (Pull Boxes)
- 5.7.0 Sprinkler System Fire Alarm and Supervision Equipment
- 6.0.0 Fire Alarm Control Units
- 6.1.0 User Control Points
- 6.2.0 FACU Initiating Device Circuits
- 6.3.0 Types of FACU Alarm Outputs
- 6.4.0 FACU Listings
- 7.0.0 FACU Primary and Secondary Power
- 8.0.0 Notification Appliances
- 8.1.0 Visual Notification Devices
- 8.2.0 Audible Notification Devices
- 8.3.0 Voice Evacuation Systems
- 8.4.0 Signal Considerations

WEBINAR S6W8 California Fire Code

S6W9 Fire Alarm Systems Part III
Module 33401-03

- 9.0.0 Communications and Monitoring
- 9.1.0 Monitoring Options
- 9.2.0 Communications Methods (Move to Week 9 after Supervising Stations
- 10.0.0 General Installation Guidelines
- 10.1.0 General Wiring Requirements
- 10.2.0 Workmanship
- 10.3.0 Access to Equipment
- 10.4.0 Power-Limited Circuits in Raceways
- 10.13.0 Fire Pumps
- 10.14.0 Remote Control Signaling Circuits
- 10.19.0 Terminal Wiring Methods
- 10.20.0 Conventional Initiation Device Circuits
- 10.21.0 Signaling Line Circuits (SLC)
- 10.22.0 Notification Appliance Circuits (NAC)
- 10.23.0 Primary Power Requirements

10.24.0 Secondary Power Requirements
10.25.0 Grounding
11.0.0 Total Premises Fire Alarm System Installation Guidelines
11.1.0 Manual Fire Alarm Box (Pull Box) Installation
11.2.0 Flame Detector Installation
11.3.0 Smoke Chamber Definition, Smoke Spread Phenomena and Stratification
11.4.0 General Precautions for Detector Installation
11.5.0 Spot Detector Installations on Flat, Smooth Ceilings
11.6.0 Photoelectric Beam Smoke Detector Installations on Flat, Smooth Ceilings
11.7.0 Spot Detector Installations on Irregular Ceilings (Move to Week 8 after Initiating Devices)
11.8.0 Notification Appliance Installation (Move to Week 9 after Notification Appliances) 13
11.9.0 FACU Installation Guidelines
11.10.0 Trouble Signal Device Installation

WEBINAR S6W9 California Fire Code

S6W10 Fire Alarm Systems Part IV
Module 33401-03

12.0.0 Fire Alarm-Related Systems and Installation Guidelines
12.1.0 Ancillary Control Relay Installation Guidelines
12.2.0 Duct Smoke Detectors
12.3.0 Door Hold-Open Releasing Service
12.4.0 Elevator Recall and Shutdown
12.5.0 Special Door Locking Arrangements
12.6.0 Suppression System Fire Alarm Installation
12.7.0 Supervision of Suppression Systems
13.0.0 Household Fire Alarm Installation Guidelines
13.1.0 Smoke Detectors
13.2.0 Household Heat Detectors
13.3.0 Household Audibility Considerations
13.4.0 Extra Sounders for Greater Life Safety
13.5.0 Household Visible Notification Appliances
13.6.0 Primary Power
13.7.0 Standby Power Requirements
13.8.0 Combination Systems
13.9.0 Monitoring/Supervision Station Systems
13.10.0 Supervising Station Verification of Signals
13.11.0 User Instructions
13.12.0 Wiring Methods
13.13.0 Residential Testing Requirements
14.0.0 Inspection, Testing and Maintenance
14.1.0 Before Testing

14.2.0 Precautions for Occupied Buildings
14.3.0 Definitions
14.4.0 General Requirements
14.5.0 Central Stations (Certificated Systems)
14.6.0 All Systems
14.7.0 Testing Methodology
14.8.0 After Testing
15.0.0 Commissioning
16.0.0 Troubleshooting
16.1.0 Alarm System Troubleshooting Guidelines
16.2.0 Addressable System Troubleshooting Guidelines

WEBINAR S6W10 California Fire Code

S6W11 Overview of Nurse Call and Signaling Systems – Module 33404-03

1.0.0 Introduction
2.0.0 Important Terms
3.0.0 Codes and Standards
3.1.0 National Fire Protection Association (NFPA)
3.2.0 Underwriters Laboratory (UL)
3.3.0 Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
3.4.0 National Electrical Manufactures Association (NEMA)
4.0.0 Types of Nurse Call Systems
4.1.0 Visual Systems
4.2.0 Audiovisual Systems
4.3.0 Microprocessor-Based Systems
5.0.0 Call Management
6.0.0 Skilled Nursing and Assisted Living Facilities
7.0.0 System Interfaces
7.1.0 Telephone Equipment
7.2.0 Entertainment Equipment
7.3.0 Paging Systems
7.4.0 Fire Alarm Systems
7.5.0 Security Systems
7.6.0 Auxiliary Alarm Devices
7.7.0 Computers and Printers
8.0.0 Installation Practices
8.1.0 Electrical Power Requirements
8.2.0 Installation Guidelines
8.3.0 Programming
9.0.0 System Checkout/Commissioning

WEBINAR S6W11 California Fire Code

S6W12 Residential and Commercial Building Networks

1.0.0 Introduction
2.0.0 Reasons for System Integration
3.0.0 The OSI Reference Model
3.1.0 The Physical Layer
3.2.0 Layer 2
3.3.0 Layer 3
3.4.0 Layer 4
3.5.0 Layer 5
3.6.0 Layer 6
3.7.0 Layer 7
4.0.0 Communications between Subsystems
4.1.0 Basic Topology
4.2.0 Protocols
4.3.0 Network Configuration in Complex Systems
4.5.0 Network Device Addresses
4.6.0 Hubs Switches and Routers
5.0.0 System Programming
6.0.0 User Interfaces
7.0.0 Fault Tolerance Procedures
8.0.0 Residential Applications
9.0.0 Commercial Building Applications
10.0.0 The Future of Residential and Commercial Building Networks.

WEBINAR S6W12 No Class. Final and Lab

Final Lab Schedule

1. Fire/Life Safety Certification Prep
2. Completing an Electrician Certification Exam form
3. Practice Test for State of California Fire/Life Safety Certification Exam
4. Final Review
5. Final Exam

What to bring:

1. Notepad
2. Pens or pencils
3. Electronic Systems Technician: Level 4 Textbook
4. 2014 Edition NFPA 70, the National Electric Code (if possible)
5. 2016 Edition NFPA 72, the National Fire Alarm Code, without the California Amendments (if possible)