Audio Visual Systems Study Guide

Basic Electricity
- Ohm's Law
- Watt's Law

Audio Cabling and Connectors
- Balanced vs. Unbalanced systems
- Shielding
- Ground loops
- Types of cable
- Types of Connectors, RCA, XLR, Phone Plugs
- Baluns

Audio Equipment
- Amplifiers
- Preamplifiers
- Crossovers
- Equalizers
- Compressors
- Limiters
- Echo and reverb
- Filters
- Noise gates
- Audio Analyzers

Audio Microphones and Loudspeakers
- Frequency Response
- Sensitivity
- dBs
- Types of Michropones
  - Condenser
  - Dynamic
  - Lavalier
- Power ratings
- Types of distortion
- Microphone polar patterns
- Resonant Frequency vs. size of speaker
- Phantom power

Audio Theory
- Frequency
- Bandwidth
- Harmonics
- Octaves
- dBs
- Dynamic range
- Headroom
- Inverse Square law
- Attenuation
- Reverberation
- Echo
- Phon
- Absorption
- Diffraction
- Reflection
- Refraction
- Phase
- Pitch
- Wavelength

Paging
- 70 V vs. 24 V systems
- Wiring installation requirements
- Speaker Phase
- Class 2 and Class 3 Audio circuit requirements
- Audio circuits near bodies of water or swimming pools
- Noise masking
- White noise
- Pink noise
- Amplifiers
- Preamplifiers

Residential
- HDTV standards
- LCD vs. Plasma
- Viewing distance
- Surround sound systems
- Recommended wattage ratings for speakers
- Recommended speaker locations
- Wire resistance vs. system impedance
- Video connectors
- Sources of noise and interference
- Zoned systems
- Speaker sensitivity

Filters
Video signal standards
Video voltage levels
Volume controls
Aspect ratio for HDTV and standard TV
HD Transmission frequencies
Ground loops
A-Bus
Video Bandwidth
DBS satellite instillation
Recommended signal strength for television broadcast in dBs
TIA/EIA 570-B standard
Maximum length for residential data links
CAT 5 and CAT 6 installation
Coaxial cable installation
Types of coaxial cable
Full-duplex vs. half-duplex transmission

Power Line Carrier
X-10
Modulation
Microphone level, vs. line level vs. speaker level
Dolby systems
Test equipment
Tip and Ring color codes for residential telephone cable
Compression Lock connectors
BNC
Service loops
Recommended clearance around a structured cabling media center
Video cable media
Audio cable media

Fire Alarm Systems Study Guide

Basic Electricity
- Ohm's Law
- Watt's Law

Fire Alarm Basics
- Fire Alarm Control Panels
- Notification Appliances
- Initiating Devices
- Smoke Detector Theory
- Heat Detector Theory
- Detector installation requirements
- Notification Appliance Sound Pressure Levels
- Smoke alarms in single family dwellings
- Normal vs. trouble vs. supervisory signals
- Fire alarm panels and ground faults, and wiring integrity
- Coded Fire Alarm Signals
- Fire suppression systems
- Signaling Line circuits
- Mounting requirements for visible notification appliances
- Waterflow switches, testing and inspection
- Class A and Class B circuits
- UL conformity for fire panels, detectors and notification appliances
- Single-station smoke alarms
- Single action vs. double action
- Addressable circuits
- Power supply requirements

Fire Alarm Miscellaneous
- ADA requirements
- Fire Command Centers
- Elevator shunt
- Smoke detectors used in HVAC systems
- Magnetic door holders
- DACT, DACR circuits
- Placards

Fire Alarm Types
- Central Station
- Proprietary
- Remote Station
- Emergency voice/alarm communications
- Combination Systems
- Single and multi-station smoke alarms

Firestop
- Purpose of Firestop
- Testing Firestop
- UL Firestop ratings
- Structural Integrity of Penetrations
- Concrete penetrations
- Firestoping definitions, ie. Intumescent, Ablative, Endothermic, etc.

NEC 760
- Power-limited Fire Alarm

NEC 725
- Class 2 and Class 3 circuits
- Installation requirements

NEC Intro
- Purpose of the code
- Understanding how to use the codebook
- Structure of the codebook
- Workspace requirements
- Basic definitions
- Size of conductors
- Types of conductors
- Listing and labeling
- Dissimilar metals
- Conductor installation in damp, wet, or dry environments
- Understanding different types of conduits and type of cable
- Installation of Boxes, and raceways

Security Alarm & Camera Systems Study Guide

Basic Electricity
- Ohm's Law
- Watt's Law

CCTV Systems
- Wiring the basic system
- Video scanning
- Video frames and fields
- Video standards
- Camera installation
- Video motion detection

CCTV Cabling
- Coaxial cable installation
- Ground loops
- Baluns

CCTV Cameras
- Types of cameras
- Camera Formats
- Pan/tilt camera mounts
- Power supplies
- Outdoor cameras

CCTV Lenses
- Types of Lenses
- Focal lengths
- What type of lenses are used in specific situations

CCTV Digital and IP
- Digital video
- Digital video motion detection
- IP compliant Network cameras
- Digital compression standards
- Power over IP

CCTV Equipment and Recorders
- DVRs
- Monitors
- Switchers
- Quad processors
- Multiplexers
- Video monitor vs. Computer terminal

- Video Resolution
- Types of batteries
- Video waveform monitor
- Video sync

CCTV Lighting
- Lighting variety
- Measurement

Card Access
- Purpose of Card Access
- Types of credentials
- Types of electronic access control
- Types of locks
- Fail-safe vs. fail-secure
- ADA requirements
- Active vs. passive sensors
- Detector technology
- Sensor technology
- Communication link
- Types of card readers
- Types of cards
- Supervised inputs

Security Systems
- Purpose of the CP-01 standard
- Motion sensors
- Glass Break sensors
- Shock sensors
- Magnetic sensors
- Infrared detectors
- Precision line microwave detectors
- Installation practice for sensors and detectors
- RJ-31X
- Central Station
- Magnetic switches, installation and mounting
- Types of glass
- Normally closed vs. normally open
- PIR

NEC Article 725
NEC Article 250 Grounding and Bonding

Voice, Data, Fiber, Cabling Study Guide

Basic Electricity
- Ohm's Law
- Watt's Law

Fiber Optic Cables
- Types and use of Fiber Optic cable
- Fiber Optic Theory
- Fiber Optic Cable Construction
- Single mode vs. Multimode
- Refractive Index
- Numerical aperture
- Fiber Optic Cable losses
- The standard core sizes of fiber optic cable
- TIA/EIA 568 B.3 fiber standard
- Fiber optic connectors
- Splicing Fiber optic cables
- Fiber optic bend radius
- Service loops
- Fiber Color Codes
- Return Loss
- Pull strength
- Budget Loss
- Pull boxes
- Acceptable Splice Losses
- Transmission distances
- Transmission wavelengths
- Fiber Tests
- Test Methods A, B, or C
- Using an OTDR

Grounding and Bonding
- Purpose of grounding
- Ground faults
- Grounding conductors
- Grounded conductors
- The Grounding System
- Types of electrodes
- Bonding jumpers
- Ground resistance requirements
- TIA/EIA 607 standards
- TGB/TMGB/TBB/CBC
- Ground block thickness, and insulated support requirements
- Color codes

NEC Article 800

Networking Cable Pinout
- Cable pinout
- Types of network cable
- Network Cable standards

Network Definitions and Protocols

Network DSL and Communications
- Types of DSL
- Transmission Distances
- Baud rate
- Frequency
- Packets
- Modems
- Communication bus

Networking Hardware
- NIC
- Hubs
- Switch
- Routers
- Gateway
- Communication analyzers
- TDR

Networking OSI and Addressing
- 7 layers of the OSI
- Binary math
- Address resolution
- Subnetting
- Class A, B, C addressing
- DSN
- Ports

Networking Topology Types
- Ring
- Star
- Bus
- Tree
- TIA/EIA 802 Standards

Structured Wiring Connectors and Cabling
- Installation requirements of structured cabling
- Requirements of pathways and conduits
- 110 Blocks
- 66 Blocks
- Types of Cable
- Screened Twisted Pair vs. UTP vs. Shielded Twisted Pair
- Riser vs. Plenum
- IDC
- Horizontal Cabling
- Vertical Cabling
- \ Maximum cable lengths (permanent link)
- Ladder Racks
- Permanent Link Tests
- Channel Tests

Structured Wiring Specifications
- Next
- FLEXT
- Attenuation
- Power Sum
- Characteristic Impedance
- ACR
- Cable Testers
- Wire Mapping
- Return Loss
- Cable performance
- Propagation Delay
- Delay Skew
- Cable CAT Ratings

Structured Wiring Standards
- Grade 1 and Grade 2 Residential Cabling standards
- TIA/EIA Residential 570 A
- TIA/EIA label color codes
- TIA/EIA Administrative standard 606
- TIA/EIA 569A
- TIA/EIA 568B
- Conduit Fill

Telecom EKS and PBX system basics

Telecom Hardware
- RJ-45 connectors
- Styles of type 89 Frames
- 66 blocks\
- 110 blocks
- Protectors
- NIU
- Butt set

Telephone Theory
- Types of Loop Circuits
- RJ-11 and RJ-14 connectors
- Nominal voltages for voice and ringer circuits
- Telephone number resolution
- “on-hook” vs. “off-hook”
- Telephone topology
- Home-runs and cabling requirements
- ISDN
- Multiplexing
- Asynchronous vs. Synchronous
- Switch tails
- Terms and Definitions, ie. POTS