



PTE #

Home Technology Integration Curriculum Guide

Idaho Division of Professional Technical Education
650 West State Street
Boise, ID 83720

2008

**HOME TECHNOLOGY INTEGRATOR
LEVEL I
FIRST SEMESTER**

A course designed to introduce students to basic elements of HIT, including electronic sensors, internet working techniques, HVAC controls, and home wiring.

TASK LISTING

STUDENT PERFORMANCE STANDARDS

EFFECTIVE DATE: June 2008

PROGRAM AREA: Skilled & Technical Sciences

PROGRAM TITLE: Home Technology Integration

**HOME TECHNOLOGY INTEGRATOR
LEVEL I
SECOND SEMESTER**

A course designed to introduce students to basic elements of HIT, including electronic sensors, internet working techniques, HVAC controls, and home wiring.

Introduction to Residential Cabling Technologies – The student will be able to:
Level I-1st Semester

- Identify and describe various electrical cables.
- Install and test a branch electrical circuit.
- Install and test a GFCI circuit breaker and receptacle.
- Install and test light fixtures that have one, two and three points of control.
- Test a circuit for proper ampacity.
- Install and test a duplex receptacle with a switch-controlled light on the same circuit, as well as a multi-circuit.
- Test fiber optic cable using a light source and power meter.
- Connect and test telephone lines and locate cable pairs.
- Explain the various cable wiring errors that can be made.
- Design, plan, estimate, install and test low-voltage services.
- Connectorize a twisted-pair patch cable.
- Make a fiber optic patch cable.
- Install a distribution panel and its' accessories.
- Pull and properly label various cables.
- Terminate horizontal cable runs.
- Understand basic soldering techniques and principles.
- Understand basic electrical metal tubing (EMT) techniques

Hands-On Experiments – The student will be able to complete the following experiments:
Level I-1st Semester

- Electrical Cable Poster
- Installing a Branch Circuit
- Installing a GFCI Circuit Breaker
- Installing a GFCI Circuit Receptacle
- Light with One Point of Control
- Checking Ampacity and Grounding
- Light with Two Points of Control
- Light with Three Points of Control
- Duplex Receptacle and Switch Controlled Light (Same Circuit)
- Duplex Receptacle and Switch Controlled Light (Multi-Circuit)
- Optical testing with a Source and Power Meter
- Locating a Cable and cable pairs
- Making a Twisted-Pair Patch Cable
- RG6 Coaxial Cable and F Connectors
- Distribution Panel and Accessories Installation
- Pre-wiring (Pulling and Labeling the Cable)
- Terminating UTP to RJ-45 Jacks
- Terminate Coax and Test the Cables
- Testing Telephone Line Polarity
- Installing a Network Interface Device (NID)
- Connecting the Service Input Hub
- Telephone Hub Hookup
- Twisted Pair Wiring Basics
- Fiber Tools and How to Use Them
- Fiber Optic Cable Poster
- Fiber Optic Theory

Visual Tests for a Fiber Optic Patch Cable
Installing St Fiber Optic Connectors
Design and planning the layout of Low-Voltage Services
Planning and installation
Analyzing Specifications and Installation Requirements
Estimating the installation
Trainer restoration
Soldering Skills
EMT Skills

Math – The student will be able to:
Level I-1st Semester

Work Ethic – The student will be able to:
Level I-1st Semester

Customer Service – The student will be able to:
Level I-1st Semester

Safety - The student will be able to:
Level I-1st Semester

**HOME TECHNOLOGY INTEGRATOR
LEVEL I
SECOND SEMESTER**

A course designed to introduce students to basic elements of HIT, including electronic sensors, internet working techniques, HVAC controls, and home wiring.

Residential Audio & Video Systems

Residential Audio & Video Systems - The student will be able to:

Level I-2nd Semester

- Describe the various types of signals used in home entertainment systems, including their use, cabling and typical termination.
- Explain the differences between the various types of surround sound and the hardware requirements to implement each type.
- Describe the role of digitization and compression in the transmission of digital signals.
- List and describe the operation of typical home theater components.
- Explain the term “aspect ratio” and describe its’ role in digital television.
- Describe the various techniques used for distributing sound throughout a home.
- Use an oscilloscope to evaluate audio signal waveforms.
- Describe the operation of an audio speaker and test its’ performance using different fixes frequencies, a microphone and an oscilloscope.
- Determine the operating characteristics of a home audio device by reading its’ specific sheet.
- Setup, test and calibrate a home audio system with the help of an audio/video calibration DVD.
- Understand basic soldering techniques and principles.
- Using the Heathkit trainer, demonstrate the process of “rough-in” wiring a whole-house audio/video system, including speaker cables, video cables, Cat 5e cable and the distribution panel.
- Using the Heathkit trainer, “trim-out” and test a whole-house audio/video system.
- Interface a home audio system to the whole-house network and evaluate its’ performance.

Audio/Video Exercises – The student will have a working knowledge of the following:

Level I-2nd Semester

- Audio and Video Cables
- Cable Connectorization
- Using Meters
- Using Oscilloscopes
- Speaker Characteristics
- Home Theater Setup and Test
- Home Theater Speaker Evaluation and Calibration
- Home Theater Video Evaluation and Calibration
- L-Pads
- Series/Parallel Speaker Connections
- Distribution Signal Losses
- Speaker Pre-Wire
- Speaker Wire Trim-out
- Coaxial Cable Signal Losses
- Measuring Speaker Frequency Response
- Measuring Room Response
- Soldering

Math – The student will be able to:
Level I-2nd Semester

Work Ethic – The student will be able to:
Level I-2nd Semester

Customer Service/Communication – The student will be able to:
Level I-2nd Semester

Safety – The student will be able to:
Level I-2nd Semester

**HOME TECHNOLOGY INTEGRATION
LEVEL II – 1ST SEMESTER
Prerequisite: Level I – 1st & 2nd Semesters**

A course designed to provide students with electronic sensors, internet working techniques, HVAC controls, and home wiring applications.

Security, Access Control & Surveillance Level II – First Semester

Basic Security Systems Electrical and Component Characteristics: The student will have a working knowledge of:

Level II-1st Semester

- Basic Electrical Principles for Security
- Electrical Schematics and Wiring Diagrams
- Electronics and Security
- Security System Terminations
- Residential Smoke and Motion Detector Technologies
- Ionization Detectors

Security and Fire Alarm Systems: The student will have a working knowledge of:

Level II-1st Semester

- Fundamental Concepts of Home Security
- Wired vs Wireless Security Systems
- Security System Components
- Annunciation Devices
- Fire Alarm Control Panel
- Initiating Devices
- Fire Alarm Control Panel
- Initiating Devices
- Notification Devices (local)
- Central Station (Digital Communications Annunciation)
- Power Sources
- False Alarms
- Security System Design

Surveillance/CCTV: The student will have a working knowledge of:

Level II-1st Semester

- The Video Process
- Test Signals
- The Digital Video
- Cabling
- Lenses and Lens Mounts
- Platforms (Pan/Tilt/Zoom Mounts)
- Software and Peripheral Devices
- Planning and Design

Access Control Systems: The student will have a working knowledge of:

Level II-1st Semester

- Electronic Access Control
- Access Control Types
- Biometrics
- Biometric Verification vs. Automated Positive Identification System
- Recognized Biometrics Identification Technology

Design Parameters for Access Control Systems

Security, Access Control & Surveillance Exercises – The student will be able to:

Level II-1st Semester

- Assemble the Camera
- Assemble BNC Video Cable
- Depth of Field
- Horizontal/Vertical Resolution
- Install Video RF Modular & Video Splitter
- Addition of Wireless Camera to Video System
- Security/Fire Alarm System Design
- Terminating Security Devices
- Determining and Setting Zone Types
- Installing Fire Detection Devices
- Functions of the Omni II Console Unit
- Installation of a Console Unit
- Self Test of the Omni II
- Enrolling the Second ID of the Access Control Devices
- Enrolling a User with 1 to 3 Fingerprints
- Enrolling a User with Access Card Only
- Enrolling a User with Access Card and PIN
- Deleting a Single Record from the Access Control Unit
- Deleting all Records in the Access Control Unit

Math – The student will be able to:

Level II-1st Semester

Work Ethic – The student will be able to:

Level II-1st Semester

Customer Service – The student will be able to:

Level II-1st Semester

Safety – The student will be able to:

Level II-1st Semester

**HOME TECHNOLOGY INTEGRATION
LEVEL II – 2nd SEMESTER
Prerequisite: Level I – 1st & 2nd Semesters**

A course designed to provide students with electronic sensors, internet working techniques, HVAC controls, and home wiring applications.

Introduction to Networking Technologies

Level II

Second Semester

After completion of this course student will be able to:

Level II-2nd Semester

- Implement password protection.
- Identify the properties of every local user on the computer.
- Add new local users to the operating system.
- Identify where user information and resources are stored on the local computer.
- Identify the current users and groups on the local computer.
- Describe the purpose of the Security and Sharing tabs of the Windows XP Pro Properties dialog box on a standalone computer.
- Explain why sharing is only useful on a network of computers.
- Explain how to configure the operating system to allow two or more active users.
- Explain the purpose of a network adapter or NIC.
- Install and configure a Plug and Play NIC.
- Enable and disable the integrated network adapter on the motherboard.
- Access and use the *Local Area Connection Properties* dialog box in Windows XP professional.
- List three software components required by a network and controlled from the *Local Area Connection Properties* dialog box.
- Define client and protocol, and explain the purpose of each.
- Explain the purpose of the Net BEUI, IPX/SPX, TCP/IP, and Appletalk protocols.
- Change the *client*, *services*, and *protocol* of a local area network connection in a Windows XP Pro computer.
- Use UTP cables and a hub to physically connect computers together in a peer-to-peer network.
- Configure a Windows XP Pro computer to act as a member of a peer-to-peer network using a hub or router.
- Describe the client, services, and protocol components of a networked Windows XP computer.
- Change the computer name and workgroup name of a Windows XP Pro computer.
- Explain the difference between Security permissions and Share permissions.
- Explain the difference between full-control access and read-only access.
- Turn sharing on or off for a particular resource.
- Access and modify files on a host computer from a remote guest.
- Find a shared resource using the Universal Naming Convention (UNC).
- Map and disconnect a network drive.
- Use computer Management to determine which resources are shared, who is accessing them, and which shared files are open.
- Implement password protection on a peer-to-peer network.
- Add users to the system.
- Explain the difference between a local user and a network user.
- Identify the current users and groups on the local computer.
- Describe the purpose of the Security and Sharing tabs of the Windows XP Professional Properties dialog box.
- Configure the TCP/IP protocol.

Use the IPCONFIG to determine the TCP/IP configuration of computers on the network.
Use PING to verify the connections to other computers on the network.
Explain three ways that TCP/IP can be configured on a Windows XP Professional-based network.
Explain the purpose of DHCP.
Predict the impact of modifying, adding, or removing DHCP services on resources and users.
Recognize the symptoms when a DHCP server is not found.
Use the IPCONFIG command to renew or release a DHCP lease.
Define wireless LAN, WLAN, Wireless Access Point (WAP), and 802.11b.
Specify the speed, access methods, topology, and media of wireless LANs.
Install and configure a Wireless Access Point. (WAP).
Install and configure a Wireless Network Interface Card.
Use the Wireless Zero Configuration utilities in Windows XP to make wireless network connections.
Modify the SSID of a wireless router, hide the broadcast of that SSID, and configure a client to make a connection with a router that is not broadcasting SSID.
Configure a wireless router to use WEP or WPA encryption and then make a connection to that router with a remote host.

Math – After completion of this course student will be able to:
Level II-2nd Semester

Work Ethic – After completion of this course student will be able to:
Level II-2nd Semester

Customer Service – After completion of this course student will be able to:
Level II-2nd Semester

Safety – After completion of this course student will be able to:
Level II-2nd Semester

HANDS-ON EXPERIMENTS – The student will have a working knowledge of:
Level II- 2nd Semester

Controlling Windows Access.
Windows Security.
The Network Interface Card (NIC).
Exploring Network Properties.
The Peer-to-Peer Network.
Sharing Resources.
Exploring the Ethernet LAN.
Implementing Security of Peer-to-Peer Networks.
Introduction to TCP/IP.
Dynamic Host Configuration Protocol.
The Wireless LAN.
The Secure Wireless LAN.

Automating & Integrating Residential Systems Level II – Second Semester

Automation/Integration Fundamentals – The student will be able to:
Level II-2nd Semester

- User Interfaces.
- Control Communications.
- Controller Programming.
- Automation/Integration Controllers.

Lighting Control – The student will be able to:
Level II-2nd Semester

- Zones.
- Lighting Scenes.

HVAC Control – The student will be able to:
Level II – 2nd Semester

- Zones.
- Remote Access.
- Thermostats and Sensors.
- HVAC Systems.
- Controller Programming.
- Cabling.

PLC/Wireless Technologies – The student will be able to:
Level II – 2nd Semester

- Power Line Phases.
- Zero Crossing.
- Complementary Data.
- X10 Data Packets.
- Transmission Timing.
- Computer Control and Networking Software.

Miscellaneous Automation Systems – The student will be able to:
Level II – 2nd Semester

- Water
- Window
- Lifts

Systems Integration – The student will be able to:
Level II – 2nd Semester

AUTOMATING/INTEGRATING EXERCISES

Universal Remote Exercises (Remote Control) – The student will be able to:

Level II-2nd Semester

- Set up the MRF-200
- Install the MX800 Editor and Connect to Remote.
- Add Devices to the MX800.
- Learn an IR Command.
- Create a Macro.

X10 Exercises (PLC) – The student will be able to:

Level II-2nd Semester

- Connect an X10 Wireless Transceiver/Appliance Module.
- Control an X10 Appliance Module with an RF Remote.
- Control an X10 Lamp Module with an RF Remote.
- Install a Wireless Motion Sensor for Triggering an X10 Device.
- Connect an X10 Computer Transceiver.
- Install the X10 Control Software.
- Add Modules.
- Set Timers.
- Add Macros.
- Delete Items.

HAI Omni Exercises (Automation) – The student will be able to:

Level II-2nd Semester

- Install Dealer PC Access.
- Create a new account.
- Connect the Omni II to Dealer PC Access via Serial.
- Connect the Omni II to Dealer PC Access via Modern Access.
- Create a basic program with PC.
- Connect the HAI Omnistat Thermostat.
- Perform simple Omnistat Programming.
- Connect the Omnistat to the Omni II.
- Configure the Omnistat on the Console.
- Configure the Omnistat with PC.
- Connect the X10 Transceiver to the Omni II.
- Set up an X10 Unit on the Console.
- Set up an X10 Unit with PC Access.
- Control an X10 Unit on the Console.
- Control an X10 Unit with PC Access.

Destiny Domain 3000 Exercises (Integration) – The student will be able to:

Level II-2nd Semester

- Perform basic Domain 3000 Connections.
- Connect the Domain 3000 to a Serial Device.
- Perform Software Installation.
- Create a New Project.
- Edit a Room.
- Add a Litetouch.
- Add a Light.

Add a Keypad.
Add a Television.
Add a VCR.
Add a Security System.
Save Project File to Domain 3000.

Math – The student will be able to:
Level II-2nd Semester

Work Ethic – The student will be able to:
Level II-2nd Semester

Customer Service – The student will be able to:
Level II-2nd Semester

Safety – The student will be able to:
Level II-2nd Semester

HTI+ Certification Test Preparation Program
Level III – Internship
(Summer of Junior/Senior or part of Senior Year)

A course designed to provide student with team work, critical thinking, problem solving, diagnostics, and repairing/building to industry standards. Emphasis of work site skills is expected at this level with the majority of the students participating in off-campus work experiences.

Given the information resources of a library, obtain and compile the information needed to seek a job.

Objectives:

- Identify the requirements for a job.
- Investigate educational opportunities.
- Investigate occupational opportunities.
- Locate resources for finding employment.
- Confer with prospective employers.
- Identify job trends.

Given appropriate information, locate a job opportunity, prepare and take an interview for it, complete the required tests, forms, and applications, and evaluate your response to the job opportunity.

Objectives:

- Locate a job opening.
- Complete a resume.
- Prepare for an interview.
- Participate in an interview.
- Complete tests required.
- Complete forms required.
- Complete an application letter.
- Complete a follow-up letter.
- Complete an acceptance letter.
- Evaluate a job offer.
- Evaluate a job rejection.

Given the assignment to explain how your capabilities make you employable, demonstrate how to match your skills and experience to a job you seek.

Objectives:

- Match your interest to job area.
- Match your aptitudes to job area.
- Verify your abilities.
- Identify your immediate work goal.
- Develop your career plan.

Given the responsibility of an employee in a new job, demonstrate your knowledge of appropriate behavior in the work place.

Objectives:

- Exhibit dependability.
- Demonstrate punctuality.
- Follow rules and regulations.
- Explain the consequences of dishonesty.
- Complete assignments accurately and on time.
- Control your emotions.
- Take responsibility for your decisions and actions.
- Take pride in your work and be a loyal worker.
- Learn to handle pressures and tensions.
- Demonstrate ability to set priorities.
- Demonstrate problem-solving skills.

Given the responsibility of an employee in a new job, demonstrate your knowledge of safety in the workplace.

Objectives:

- Comply with safety and health rules.
- Select correct tools and equipment.
- Utilize equipment correctly.
- Use appropriate action during emergencies.
- Maintain clean and orderly work area.
- Demonstrate personal hygiene and cleanliness.
- Identify and locate Material Safety Data Sheets (MSDS).

Given the responsibility to perform the duties of a new job, with a new employer, demonstrate a knowledge of the actions and behaviors which will project a business-like image.

Objectives:

- Participate in company or agency orientation.
- Demonstrate knowledge of company or agency products and services.
- Exhibit positive behavior.
- Read current job-related publications.
- Support and promote employer's company image and purpose.
- Maintain appearance to comply with company standards.

Given the responsibility to perform the duties of a new job, with a new employer, demonstrate knowledge of how to successfully work with others.

Objectives:

- Work productively with others.
- Show empathy, respect, and support for others.
- Demonstrate procedures and assist others when necessary.
- Recognize problems and work toward their solution.
- Minimize the occurrence of problems.
- Channel your emotional reactions in positive ways.

Given the responsibility to perform the duties of a new job, with a new employer, demonstrate knowledge of how to successfully communicate with others.

Objectives:

- Read and comprehend written communications and information.
- Use correct grammar.
- Speak effectively with others.
- Use job-related terminology.
- Listen attentively.
- Write legibly.
- Use proper telephone etiquette.
- Follow written and oral directions.
- Ask questions.
- Locate information in order to accomplish task.
- Prepare written communication.
- Utilize proper keyboarding skills.
- Utilize appropriate computer skills.

Given the responsibility to perform the duties of a new job, with a new employer, demonstrate knowledge of how to adapt to change.

Objectives:

- Recognize the need to change.
- Demonstrate a willingness to learn.
- Demonstrate flexibility.
- Participate in continuing education.
- Seek challenge in the work place.
- Adjust goals and plans when necessary.

Given the responsibility to perform the duties of a new job, with a new employer, demonstrate knowledge of the role of that business, its employees, and the free enterprise system.

Objectives:

- Explain the role of business in the free enterprise system.
- List the responsibilities of employees.
- Identify the responsibilities of managers and employers.
- Discuss the opportunities for business ownership or management.
- Describe the planning required to start a business.
- Discuss the importance of business meetings.