INFORMATION TECHNOLOGY CAREER CLUSTER DESIGN

Information Support & Services Pathway – CIP Code 11.0301

Approved Pathway:

1) Includes minimum of three secondary- level credits.
2) Includes a work- based element.
3) Consists of a sequence: Introductory-level, Technical-level, and Application-level courses.
4) Supporting documentation includes Articulation Agreement(s), Certification, Program Improvement Plan, and a Program of Study.
5) Technical-level and Application-level courses receive .5 state-weighted funding in an approved CTE pathway.

INTRODUCTORY LEVEL

Computing Systems	10002/60002	1 credit
Computer Application	10004/60004	1 credit

TECHNICAL LEVEL

Computer Maintenance	10252	1 credit
IT Essentials: PC Hardware & Software	10254	1 credit
Database Applications	10053	1 credit
Data Systems/Processing	10054	1 credit
Computer Technology	10251	1 credit
Info. Support & Services	10253	1 credit
CISCO Network Infrastructure Essentials	10255	1 credit
Information Management	10051	1 credit

APPLICATION LEVEL

Database Mgmt. & Data Warehousing	10052	1 credit
Particular Topics in Info. Support and Serv.	10055	1 credit
Educational Trainer	10260	1 credit
Information Support Project Mgmt. &Res. Scheduling	31097	1 credit

KANSAS STATE CAREER CLUSTER COMPETENCY PROFILE
INFORMATION TECHNOLOGY CLUSTER
Information Support & Services Pathway – CIP Code 11.0301

STUDENT _____

Rating Scale:

   3 - Proficient Achievement

   2 - Limited Achievement

   1 - Inadequate Achievement

   0 - No Exposure

COMMON CAREER TECHNICAL CORE – CAREER READY STANDARDS

1. Act as a responsible and contributing citizen and employee
2. Apply appropriate academic and technical skills
3. Attend to personal health and financial well-being
4. Communicate clearly, effectively and with reason
5. Consider the environmental, social and economic impacts of decisions
6. Demonstrate creativity and innovation
7. Employ valid and reliable research strategies
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management
10. Plan education and career path aligned to personal goals
11. Use technology to enhance productivity
12. Work productively in teams while using cultural/global competence

COMMON CAREER TECHNICAL CORE – INFORMATION TECHNOLOGY CLUSTER STANDARDS

1. Demonstrate effective professional communication skills and practices that enable positive customer relationships.
2. Use product or service design processes and guidelines to produce a quality information technology product or service.
3. Demonstrate the use of cross- functional teams in achieving IT project goals.
4. Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
5. Explain the implications of IT on business development.
6. Describe trends in emerging and evolving computer technologies and their influence on IT practices.
7. Perform standard computer backup and restore procedures to protect IT information.
8. Recognize and analyze potential IT security threats to develop and maintain security requirements.
9. Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
10. Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
11. Demonstrate knowledge of the hardware components associated with information systems.
12. Compare key functions and applications of software and determine maintenance strategies for computer systems.

INTRODUCTORY LEVEL COURSES
10002 Computing Systems

Computing Systems courses offer a broad exploration of the use of computers in a variety of fields. These courses have a considerable range of content, but typically include the introduction of robotics and control systems, computer-assisted design, computer-aided manufacturing systems, and other computer technologies as they relate to industry applications.

3 2 1 0   1. **Overview of Systems**
   a. Identify computer classifications and hardware.
      i. Identify types of computer storage devices.
      ii. Identify major hardware components and their functions.
      iii. Identify the different types of computing devices.
   b. Identify new IT technologies and assess their potential importance and impact on the future.
   c. Identify new & emerging drivers and inhibitors of information technology change.
   d. Operate computer-driven equipment and machines.
   e. Apply knowledge of operating systems principles to ensure optimal functioning of system.
   f. Understand data communications trends and issues.
   g. Demonstrate knowledge of data transmission codes and protocols.
   h. Understand elements and types of information processing. (i.e., input, process, output).
(e.g., batch, interactive, event- driven, object-oriented).

3 2 1 0   **2. Computer Operations**
   a. Identify and understand the fundamentals of operating systems and their components.
   b. Configure systems to provide optimal system interfaces
   c. Clearly document step-by-step installation procedures for future use and configuration.
   d. Apply concepts of privileged instructions and protected mode programming.
   e. Configure peripheral device drivers (e.g., disk, display, printer, modem, keyboard, and mouse).
   f. Allocate disk space, non-sharable resources, and I/O devices.
   g. Interface peripheral devices/controllers in the computer system (e.g., software and hardware interrupts, exceptions, Direct Memory Addressing [DMA], bus structures).
   h. Identify standards and issues related to I/O programming and design of I/O interfaces.
   i. Define hardware-software interface issues for a computer system.
   j. Review automated scheduling software and Identify scheduling priority in programming.
   k. Document procedures and actions through development of audit trails.

3 2 1 0   **3. Hardware**
   a. Ensure that hardware and software system components are compatible and licensed prior to performing installation.
   b. Evaluate systems engineering considerations.
   c. Demonstrate knowledge of how bandwidths affect data transmission and on-screen image.
   d. Evaluate information systems problem-solving techniques and approaches.
   e. Determine the accuracy and completeness of the information gathered.
   f. Explain data communications procedures, equipment and media.
   g. Explain measurement techniques for increased productivity due to information systems implementation.
   h. Explain the differences between local and wide area networks.
   i. Explain the benefits of hosting a web site on a local server vs. at an ISP (Internet Service Provider).
   j. Troubleshoot computer-driven equipment and machines and access support as needed
   (e.g. Test system using diagnostic tools/software, repair/replace malfunctioning hardware and reinstall software as needed, recover data and/or files and restore system to normal operating standards.)

3 2 1 0   **4. Software**
   a. Determine software design process, from specification to implementation and appraise software process and product life cycle models.
   b. Explain new and emerging classes of software.
   c. Explain the key functions and applications of software.

d. Demonstrate knowledge of the function and operation of compilers and interpreters.
e. Demonstrate knowledge of widely used software applications (e.g., word processing, database management, spreadsheet development, publishing software).
f. Demonstrate an understanding of various programming paradigms (OO, functional, logic) in software development
g. Demonstrate knowledge of how data is organized in software development: source version data, project progress data, etc. to increase individual efficiency and respect team member data.
h. Explain the features and functions of how web browsing software affects the look of a web page, consider the characteristics and uses of plug- ins and examine role of browsers in reading files on the World Wide Web (text-only, hypertext).
i. Explain the role of number systems in information systems and internal data representation.
j. Identify the role the binary system in information systems.

3 2 1 0 **5. Serving the needs of the end user**
a. Communicate to understand the problem the user wants to solve independent of the technology (empathy). Consider develop context awareness -- consider the context of the user and the problem before proposing a solution.
b. Perform software customization as requested to meet the needs of the end user.
c. Perform installation accurately and completely, using available resources as needed.
d. Resolve problems with installation if they occur.
e. Test and maintain products /services.
f. Initiate predictive maintenance procedures.
g. Consider customer satisfaction in determining product characteristics (e.g., usefulness, price, operation, life, reliability, safety, and cost of operation).
h. Use available reference tools (e.g., procedural manuals, documentation, standards, and work flowcharts) as appropriate to access needed information.
i. Use installation/operation manuals to access needed information using appropriate reference materials.
j. Use reliability factors (e.g., cost, human, productivity) to plan for and create products/ services; with consideration of maintainability, good design, design simplification, and design redundancy.
k. Demonstrate knowledge of critical thinking skills, decision-making skills and develop a plan using data-oriented techniques.

10004-Computer Applications
In Computer Applications courses, students acquire knowledge of and experience in the proper and efficient use of previously written software packages. These courses explore a wide range of applications, including (but not limited to) word-processing, spreadsheet, graphics, and database programs, and they may also cover the use of electronic mail and desktop publishing.

3 2 1 0 **1. Personal Information Management**
a. Identify PIM applications (e.g., Essential PIM, MS Outlook, Lotus Notes...) and maintain safe and secure user profiles.
b. Manage daily/weekly/monthly schedule using applications such as. (e.g., Notes, MS Outlook, calendars/schedules.)
c. Create reminder for oneself and send notes/ informal memos using PIM applications.
d. Access email system using login and password functions. Access email messages received
e. Create and send e-mail messages in accordance with established business standards (e.g., grammar, word usage, spelling, sentence structure, clarity) demonstrating knowledge of email etiquette.
f. Attach files to send with messages and access and save received attachments.
g. Demonstrate knowledge of contamination protection strategies for email.
h. Maintain shared database of contact information.
i. Participate in virtual group discussions and meetings.

3 2 1 0 **2. Research and Internet**
a. Test Internet connection.
b. Navigate web sites using software functions. (e.g., Forward, Back, Go To, Bookmarks). Utilize online tools

c. Explore the multimedia capabilities of the World Wide Web.
d. Bookmark web addresses (URLs).
e. Locate information using appropriate search procedures and approaches through a variety of search engines and Boolean logic.
f. Access, evaluate accuracy, and compile Internet resource information for a variety of purposes. (e.g., library catalogs, business, technical, commercial, government, educational)
g. Unpack files using compression software. Organize and archive files.

3 2 1 0 3. **Word Processing and Presentations**
a. Create/Open Edit and Save documents (e.g., letters, memos, reports) and presentations using existing forms and templates.
b. Employ word processing utility tools (e.g., spell checker, grammar checker). Locate/replace data using search and replace functions.
c. Format text using basic formatting functions.
d. Enhance publications using different fonts, styles, attributes, justification, etc.
e. Enhance publications using paint/draw functions.
f. Format new desktop publishing files and recognize the advantages and disadvantages of export options.
g. Place graphics (e.g., graph, clip art, table) in a document or slide in accordance with basic principles of graphics design and visual communication.
h. Prepare publications using desktop and cloud publishing applications.

3 2 1 0 **4. Spreadsheets**
a. Create/Open Edit and Save spreadsheets.
b. Create charts and graphs from spreadsheets.
c. Group worksheets.
d. Input/process data using spreadsheet functions.
e. Perform calculations using simple formulas.
f. Locate/replace data using search and replace functions.
g. Process data using database functions (e.g., structure, format, attributes, relationships, keys).
h. Perform single- and multiple-table queries (e.g., create, run, save).
i. Verify accuracy of output.
j. Maintain shared database of contact information.

3 2 1 0 **6. Ethics and Security**
a. Demonstrate knowledge of potential internal and external threats to security. Maximize threat reduction.
b. Assess exposure to security issues.
c. Demonstrate knowledge of virus protection strategy and ability to load virus detection/protection software.
d. Identify sources of virus infections and how to remove viruses.
e. Report viruses in compliance with company standards.
f. Ensure compliance with security rules, regulations, and codes.
g. Explore ways to implement countermeasures.
h. Implement security procedures in accordance with business ethics.
i. Document security procedures.
j. Understand how to follow a disaster plan.
k. Understand how to utilize backup and recovery procedures.
l. Maintain confidentiality.
m. Understand how to provide for user authentication (e.g., assign passwords, access level).

3 2 1 0 **7. History / Quality Assurance**
Demonstrate knowledge of the diverse continuous improvement cycles within industry and their characteristics.
(e.g., Baldridge Performance Excellence, Demming, ISO 9000, Six Sigma)

3 2 1 0 **8. Personal Attributes for success. Career Technical Core Skills**.
a. Act as a responsible and contributing citizen and employee
b. Demonstrate effective professional communication skills and practices that enable positive customer relationships.
c. Apply appropriate academic and technical skills

d. Attend to personal health and financial well-being
e. Communicate clearly, effectively and with reason
f. Consider the environmental, social and economic impacts of decisions
g. Demonstrate the use of cross-functional teams in achieving IT project goals.
Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.

TECHNICAL LEVEL COURSES

10251 Computer Technology

This technical course introduces students to basic computer hardware and software. Throughout this course student will analyze how various computer parts interact with each other and outside components, software requirements and how to diagnose issues. Topics will include: computer configuration, installation, upgrading and troubleshooting.

3210 1. Identify support needs
3210 2. Apply information and data analysis techniques
3210 3. Identify skill level needs and available resources.
3210 4. Define scope of work to meet customer needs.
3210 5. Identify resources.
3210 6. Evaluate present data and system configuration.
3210 7. Formulate a support plan/confirm plan with client.
3210 8. Respond to user questions
3210 9. Provide troubleshooting for hardware/software.
3210 10. Diagnose problems within system.
3210 11. Perform technical functions required by customer/user.
3210 12. Employ appropriate hardware and software tools to perform task in the most cost-effective manner.
3210 13. Maintain timeliness and professionalism during interaction.
3210 14. Communicate and document technical support provided.
3210 15. When appropriate, follows up support session for evaluation.
3210 16. Employs evaluative tools (software/recordings) to check work.
3210 17. Understands steps to take to create improvement plan when needed.
3210 18. Analyze Symptoms of problem and use diagnostic skills.
3210 19. Employ effective problem-solving skills in performing support, maintenance and/or repair.
3210 20. Perform work flow analysis to determine user needs.
3210 21. Evaluate appropriateness of software for specific projects.
3210 22. Document results of the software evaluation.
3210 23. Perform a software configuration audit.
3210 24. Perform a physical configuration audit.
3210 25. Develop a method for evaluation.
3210 26. Test the functionality of proposed software configuration.
3210 27. Demonstrate knowledge of the CPU (Intel, AMD, etc) & sockets.
3210 28. Demonstrate knowledge of INPUT devices (keyboard, mouse, touchpad, cameras, scanners, midis, barcode scanners, etc).
3210 29. Demonstrate knowledge of OUTPUT devices (printers, CRTs, LCD monitors, network devices).
3210 30. Demonstrate knowledge of PDAs and Phones and how they connect to and share data with computers.
3210 31. Demonstrate knowledge of power and power supplies and how associated problems can be solved.
3210 32. Demonstrate knowledge of peculiar features and problems of notebooks, PDAs and other portable devices.
3210 33. Demonstrate knowledge of motherboard/CPU (North/Southbridge, L1/L2, multi-core, bus, 32/64 bit, form- factor, slots, etc).
3210 34. Demonstrate knowledge of Chipsets/BIOS and their drivers.
3210 35. Demonstrate knowledge of memory modules (RIMM, Dimm, SDRAM, DDR, DDR2, etc.).

3210 36. Demonstrate knowledge of hard drive technologies (IDE, EIDE, SATA, SCSI, etc.)
3210 37. Demonstrate knowledge of video cards and slots (VGA, XVGA, VESA, SLI, etc).
3210 38. Demonstrate knowledge of I/O ports (serial, parallel, USB, PS/2, Firewire, etc).
3210 39. Demonstrate knowledge of modem/NIC ports and troubleshooting their problems.
3210 40. Explain the purpose of computer components and how they work together as a system.
3210 41. Identify primary PC components and the functions of each.

10253 Information Support & Services

Information Support and Services will be an interactive course where students will work with users who are experiencing technical issues through various methods of communication. Students will use their prior knowledge of computer technology to diagnose issues a user is experiencing and will formulate a plan of action to resolve issues while providing support in a professional, timely manner. Technical writing, listening, and communication skills will be discussed.

3210 1. Apply information and data analysis techniques.
3210 2. Define scope of work to meet customer needs.
3210 3. Evaluate present data and system configuration.
3210 4. Formulate a support plan/confirm plan with client.
3210 5. Identify resources.
3210 6. Identify skill level needs and available resources.
3210 7. Identify support needs.
3210 8. Communicate and document technical support provided.
3210 9. Diagnose problems within system.
3210 10. Employ appropriate hardware and software tools to perform task in the most cost-effective manner.
3210 11. Maintain timeliness and professionalism during interaction.
3210 12. Perform technical functions required by customer/user.
3210 13. Provide troubleshooting for hardware/software.
3210 14. Respond to user questions.
3210 15. Employs evaluative tools (software/recordings) to check work.
3210 16. Understands steps to take to create improvement plan when needed.
3210 17. When appropriate, follows up support session for evaluation.

10255 CISCO- Network Infrastructure Essentials

The course provides student with the knowledge to create innovative network infrastructure solutions and offers basic cable installer information and acquire the skills to build and use the physical layer of network infrastructure and develop a deeper understanding of networking devices.

3 2 1 0   1. Identify physical requirements for system implementation.
3 2 1 0   2. Identify system requirements for various types of installations
3 2 1 0   3. Analyze existing procedures
3 2 1 0   4. Evaluate installation requirements
3 2 1 0   5. Resolve conflicting requirements.
3 2 1 0   6. Analyze facilities' bandwidth requirements.
3 2 1 0   7. Identify site and system constraints
3 2 1 0   8. Analyze facilities' capacity planning (power cable/wire conduit).
3 2 1 0   9. Demonstrate knowledge of various frame types and formats.
3 2 1 0   10. Describe common VoIP protocols, including Session Initiation Protocol (SIP), H.323, and Megaco/H.248.
3 2 1 0   11. Demonstrate knowledge of the open system interconnection (OSI) standard (ISO Standard 7498).
3 2 1 0   12. Demonstrate knowledge of the TCP/IP protocol suite.
3 2 1 0   13. Identify standard high-speed networks (e.g., broadband, ISDN, SMDS, ATM, FDDI).
3 2 1 0   14. Demonstrate knowledge of the role that routers, firewalls, intrusion detection systems, and VPNs play

in security.

3 2 1 0   15. Perform remote monitoring.
3 2 1 0   16. Recognize security problems.
3 2 1 0   17. Recognize system alerts.
3 2 1 0   18. Document network system malfunction(s).
3 2 1 0   19. Fix recoverable problems.
3 2 1 0   20. Respond to system messages.
3 2 1 0   21. Run diagnostics
3 2 1 0   22. Identify CISCO router products.
3 2 1 0   23 Install CISCO router products.
3 2 1 0   24. Isolate system faults in various types of networks, cables, data modems, and carrier systems.

10051 Information Management

Information Management courses provide students with the knowledge and skills to develop and implement a plan for an information system that meets the needs of business. Students develop an understanding of information system theory, skills in administering and managing information systems, and the ability to analyze and design information systems.

3 2 1 0 1. Conduct a preliminary investigation.
3 2 1 0 2. Define the scope of the systems project.
3 2 1 0 3. Identify the phases in a system project.
3 2 1 0 4. Select basic fact-gathering techniques to be used.
3 2 1 0 5. Design a framework for evaluating individual applications.
3 2 1 0 6. Design a framework for evaluating information system functions.
3 2 1 0 7. Recommend new features or enhancements to existing tools.
3 2 1 0 8. Research the concept of information system life cycles.
3 2 1 0 9. Define/Prioritize communication needs.
3 2 1 0 10. Determine the size and specifics of the work to be completed.
3 2 1 0 11. Estimate time, materials, and capabilities needed to complete assignment.
3 2 1 0 12. Evaluate strengths and weaknesses of completed project.
3 2 1 0 13. Specify project objectives.
3 2 1 0 14. Conduct interviews with selected human information sources.
3 2 1 0 15. Define research questions.
3 2 1 0 16. Determine priorities for the information that should be gathered.
3 2 1 0 17. Evaluate potential sources of information based on established criteria (e.g., affordability, relevance).
3 2 1 0 18. Identify potential sources of information.
3 2 1 0 19. Identify subject-matter experts.
3 2 1 0 20. Identify target audience.
3 2 1 0 21. Target audience/user group as a key information source.
3 2 1 0 22. Access needed information using standard references and sources.
3 2 1 0 23. Analyze data.
3 2 1 0 24. Compile relevant data.
        25. Determine audience.
        26. Draft report.
3 2 1 0 27. Draw conclusions from data analysis.
3 2 1 0 28. Edit report (e.g., check spelling, grammar, punctuation, sentence structure, accuracy of content)
3 2 1 0 29. Identify type of report needed.
3 2 1 0 30. Organize data into charts & graphs.
3 2 1 0 31. Outline report.
3 2 1 0 32. Present reports.
3 2 1 0 33. Proofread revised report.
3 2 1 0 34. Review report with peers.
2 2 1 0 35. Revise report as needed based on peer feedback

10252 Computer Maintenance

This hands-on course will take the prior knowledge and theory of how computers work and will allow students to physically work on computers. Throughout this course student will install/uninstall computer components and software, diagnose technical issues and provide troubleshooting support. Other areas explored will include: the prevention and recovery from viruses, errors and breaches; upgrading computer components and software; knowledge of networking components; and providing proper documentation of steps performed.

3 2 1 0 1. Diagnose problems within system.
3 2 1 0 2. Test the functionality of proposed software configuration.
3 2 1 0 3. Demonstrate knowledge of Chipsets/BIOS and their drivers.
3 2 1 0 4. Demonstrate knowledge of motherboard/CPU   (North/Southbridge, L1/L2, multi-core, bus, 32/64 bit, form- factor, slots, etc).
3 2 1 0 5. Demonstrate knowledge of the CPU (Intel, AMD, etc) and sockets.
3 2 1 0 6. Connect peripherals and expansion cards to/in mainboard.
3 2 1 0 7. Demonstrate knowledge of error messages and symptoms of hardware failures.
3 2 1 0 8. Install hard drives (HDD, FDD, CD, CDR) both EIDE and SATA.
3 2 1 0 9. Install mainboard (with memory/CPU).
3 2 1 0 10. Transfer system settings and files from old system to new.
3 2 1 0 11. Differentiate between hardware and software failure.
3 2 1 0 12. Identify problems in the operating system and related hardware.
3 2 1 0 13. Reinstall software as needed.
3 2 1 0 14. Repair/replace malfunctioning hardware.
3 2 1 0 15. Test system using diagnostic tools/software.
3 2 1 0 16. Connect stations to peripheral devices, especially printers.
3 2 1 0 17. Install new hardware (drives, cards, etc) on O/S.
3 2 1 0 18. Protect stations from viruses, malwares, adwares, security breaches, etc.
3 2 1 0 19. Recover from system errors.
3 2 1 0 20. Test integrity and drivers of all devices recognized by O/S.
3 2 1 0 21. Upgrade from one generation of O/S to the next.
3 2 1 0 22. Demonstrate knowledge of the characteristics and uses of network components (e.g., hub, switches, routers, firewall).
3 2 1 0 23. Implement recovery procedures as needed. Minimize impact of problems on productivity (e.g., minimize downtime).
3 2 1 0 24. Document performance problems.
3 2 1 0 25. Participate in the evaluation, analysis, and recommendation of technical computing products.

10254 IT Essentials: PC Hardware & Software

*IT Essentials: PC Hardware and Software course introduces students to the fundamentals of computer hardware and software, mobile devices, security and networking concepts, and the responsibilities of an IT professional. The latest release includes mobile devices, Linux, and client side virtualization, as well as expanded information about Microsoft Windows operating systems, security, networking, and troubleshooting. By the end of the course, students will be able to: * Describe the internal components of a computer and assemble a computer system. * Install and understand operating systems on computers and mobile devices. * Connect to the Internet and share resources in a networked environment. * Troubleshoot using system tools and diagnostic software.*

3 2 1 0 1. Identify how the four components of a network operating system support network operations (i.e., server platform, network services software, network redirection software, communications software)
3 2 1 0 2. Select a LAN/WAN technology that meets defined set of requirements.
3 2 1 0 3. Demonstrate knowledge of the principles and operation of fiber optics, analog and digital circuits.
3 2 1 0 4. Demonstrate knowledge of the principles and operation of wire (coaxial, fiber optics, etc.) and wireless syst ems.

3 2 1 0 5. Demonstrate knowledge of the open system interconnection (OSI) standard (ISO Standard 7498).
3 2 1 0 6. Demonstrate knowledge about the difference between stand-alone, peer-to- peer and client-server networks and software.
3 2 1 0 7. Demonstrate knowledge of network operating systems (i.e., Windows XP, LINUX, UNIX, etc.).
3 2 1 0 8. Demonstrate knowledge of the general characteristics of network operating systems.
3 2 1 0 9. Add capability to a software system by recording macros and storing them in the system's library.
3 2 1 0 10. Assemble necessary components to complement information system design.
3 2 1 0 11. Configure software appropriately for system and user application.
3 2 1 0 12. Convert data between different software packages and between software and the OS version.
3 2 1 0 13. Customize a general-purpose software package (e.g., DBMS) to provide specific functionality beyond the default setting.
3 2 1 0 14. Import/Export data between different software packages.
3 2 1 0 15. Install LAN Management software.
3 2 1 0 16. Load software with minimum disruption of process flow.
3 2 1 0 17. Resolve compatibility issues.
3 2 1 0 18. Demonstrate knowledge of hard drive setup and troubleshooting.
3 2 1 0 19. Demonstrate knowledge of hard drive technologies (IDE, EIDE, SATA, SCSI, etc).
3 2 1 0 20. Configure hardware system.
3 2 1 0 21. Demonstrate knowledge of how hardware components interact and how conflicts arise.
3 1 0 22. Employ appropriate safety precautions when working with PC.
3 2 1 0 23. Install mainboard (with memory/CPU).
32 1 0 24. Restore system and configuration.
3 2 1 0 25. Demonstrate hard drive maintenance procedures (defrag/scan (2) clear caches, etc).
3 2 1 0 26. Differentiate between hardware and software failure.
3 2 1 0 27. Identify problems in the operating system and related hardware.
3 2 1 0 28. Update flash memory (BIOS).
3 2 1 0 29. Demonstrate knowledge of how to turn LANs into MANs and WANs.
3 2 1 0 30. Differentiate between LANs, MANs and WANs.
3 2 1 0 31. Identify the basic broadcast topologies (e.g., star ring, bus).
3 2 1 0 32. Identify the basic point-to-point network topologies (e.g., star, ring, tree, network, irregular). 3 2 1 0 33. Interpret basic networking terminology.

10053 Database Applications

Database Application courses provide students with an understanding of database development, modeling, design, and normalization. These courses typically cover such topics as SELECT statements, data definition, manipulation, control languages, records, and tables. In these courses, students may use Oracle WebDB, SQL, PL/SQL, SPSS, and SAS and may prepare for certification.

3 2 1 0 1. Develop programs using appropriate language.
3 2 1 0 2. Use user interface development tools.
3 2 1 0 3. Identify the use of program design tools in a software development process.
3 2 1 0 4. Demonstrate knowledge of how a programming language can support multitasking and exception- handling.
3 2 1 0 5. Demonstrate knowledge of the basic principles for analyzing a programming language.
3 2 1 0 6. Demonstrate knowledge of the basics of structured, object-oriented language.
3 2 1 0 7. Demonstrate knowledge of the concepts of data and procedural representations.
3 2 1 0 8. Demonstrate knowledge of current key programming languages and the environment they are used in.
3 2 1 0 9 Demonstrate knowledge of key constructs and commands specific to a language.
3 2 1 0 10. Translate data structure and program design into code in an appropriate language.

3 2 1 0   11. Demonstrate knowledge of how programming control structures are used to verify correctness.
3 2 1 0   12. Demonstrate knowledge of how to design and implement programs in a top- down manner.
3 2 1 0   13. Demonstrate knowledge of structured/modular programming.
3 2 1 0   14. Divide design specifications into logical process blocks.
3 2 1 0   15. Follow specifications or drawings.
3 2 1 0   16. Identify parameters.
3 2 1 0 17. Create a database from model specifications using both program code and Graphic User Interface (GUI) processes when provided by the database
3 2 1 0   18. Perform standard maintenance on the database.
3 2 1 0   19. Release software and documentation updates according to procedures.
3 2 1 0   20. Develop scripts and forms that permit access via websites to the database.
3 2 1 0   21. Identify and analyze potential security problems for web access to the database.
3 2 1 0   22. Implement solutions in code and documentation.
3 2 1 0   23. Propose security solutions to web- based security problems.

10054 Data Systems / Processing

Data Systems/Processing courses introduce students to the uses and operation of computer hardware and software and to the programming languages used in business applications. Students typically use BASIC, COBOL, and/or RPL languages as they write flowcharts or computer programs and may also learn data-processing skills.

3 2 1 0   1. Demonstrate knowledge of hard drive technologies (IDE, EIDE, SATA, SCSI, etc).
3 2 1 0   2. Demonstrate knowledge of I/O ports (serial, parallel, USB, PS/2, Firewire, etc).
3 2 1 0   3. Demonstrate knowledge of INPUT devices (keyboard, mouse, touchpad, cameras, scanners, midis, barcode scanners, etc).
3 2 1 0   4. Demonstrate knowledge of OUTPUT devices (printers, CRTs, LCD monitors, network devices).
3 2 1 0   5. Demonstrate knowledge of how a programming language can support multitasking and exception-handling.
3 2 1 0 6. Demonstrate knowledge of the basic principles for analyzing a programming language.
3 2 1 0   7. Demonstrate knowledge of the basics of structured, object-oriented language.
3 2 1 0   8. Demonstrate knowledge of the concepts of data and procedural representations.
3 2 1 0   9. Demonstrate knowledge of the hardware-software connections.
3 2 1 0   10. Demonstrate knowledge of current key programming languages and the environment they are used in.
3 2 1 0   11. Demonstrate knowledge of key constructs and commands specific to a language.
3 2 1 0   12. Translate data structure and program design into code in an appropriate language.
3 2 1 0   13. Demonstrate knowledge of the range of languages used in software development.
3 2 1 0   14. Analyze and prepare logic using at least one alternative to flowcharting such as pseudo coding.
3 2 1 0   15. Analyze and prepare logic using program flowchart.
3 2 1 0   16. Compile and debug code.
3 2 1 0   17. Conduct unit testing and bug fixes.
3 2 1 0   18. Prepare code documentation.
3 2 1 0   19. Prepare unit testing plan.
3 2 1 0   20. Review design (e.g., peer and/or user walkthrough).
3 2 1 0   21. Use appropriate programming language.

 APPLICATION LEVEL COURSES

10052 Database Management & Data Warehousing

Database Management and Data Warehousing courses provide students with the skills necessary to design databases to meet user needs. Courses typically address how to enter, retrieve, and manipulate data into useful information. More advanced topics may cover implementing interactive applications for common transactions and the utility of mining data.

3 2 1 0 1. Analyze and normalize the developed database model looking for and resolving potential problems.

3 2 1 0 2. Analyze the security needs for the database.
3 2 1 0 3. Apply information and data analysis specifications to create a database model using techniques such as (e.g. -Entity Relationship Diagramming).
3 2 1 0 4. Identify appropriate database type based on customer requirements, availability of software and hardware resources, and distribution
3 2 1 0 5. Communicate and document technical support provided.
3 2 1 0 6. Perform database queries to analyze database functionality and diagnose problems.
3 2 1 0 7. Perform database troubleshooting and system-tuning functions.
3 2 1 0 8. Perform standard maintenance on the database.
3 2 1 0 9. Perform technical functions required by customer/user.
3 2 1 0   10. Populate the database created with test data.
3 2 1 0   11. Verify that all possible security safeguards are in place.

10055 Particular Topics in Information Services and Support

In addition to listed technical competencies Local Education Agencies are encouraged to develop Personalized Learning coursework representative of explicit objectives measured against specific target employment skills that are not available in other courses. These should be enumerated in addition to those listed below.
Course may be developed around particular topics in Information and support services (e.g. Security in Cross Network Environments, - Managing Data Backup and Encryption Across Cloud, -Military and Governmental Standards for Access, - Additional competencies should reflect the particular work environment and the essential skills addressed reflective of previous coursework.

3210 1. 1 Employ customer service principles/scientific method when working with consumers.
3210 2. Perform configuration management and evaluate software.
3210 3. Demonstrate ability to build or install components and systems of computers.
3210 4. Apply knowledge of network classifications, topologies and network operating systems.
3210 5. Manage backup and recovery systems.
3210 6. Complete general system administration tasks.
3210 7. Demonstrate sound technical writing and communication skills.

10260 Educational Trainer

Educational Trainer course provides instruction and practice for students who can train teachers, peers, and community in the effective integration of technology. Training on various technology tools, professional demeanor, customer service, and troubleshooting.

3 2 1 0 1. Identify support needs.
3 2 1 0 2. Identify skill level needs and available resources.
3 2 1 0 3. Define scope of work to meet customer needs.
3 2 1 0 4. Identify resources.
3 2 1 0 5. Formulate a support plan/confirm plan with client.
3 2 1 0 6. Respond to user questions.
3 2 1 0 7. Maintain timeliness and professionalism during interaction.
3 2 1 0 8. When appropriate, follows up support session for evaluation.
3 2 1 0 9. Understands steps to take to create improvement plan when needed.
3 2 1 0 10. Provide troubleshooting for hardware/software.
3 2 1 0 11. Diagnose problems within system.
3 2 1 0 12. Perform technical functions required by customer/user.
3 2 1 0 13. Employ appropriate hardware and software tools to perform task in the most cost- effective manner.
3 2 1 0 14. Communicate and document technical support provided.
3 2 1 0   15. Operate help desk.
3 2 1 0 16. Employ desktop productivity tools.

3 2 1 0 17. Support computer users
3 2 1 0 18. Train computer users.
3 2 1 0 19. Determine customers' individual needs.
3 2 1 0 20. Project a professional business image (e.g. appearance, voice, grammar, word usage, enunciation, nonverbal communication).
3 2 1 0 21. Interact with customers and colleagues in a professional manner (e.g., prompt, friendly, courteous, respectful, helpful, knowledgeable, understandable).
3 2 1 0 22. Ensure that your assistance promotes the best interests of the company.
3 2 1 0 23. Create calendars / schedules.
3 2 1 0 24. Maintain appointment calendars.
3 2 1 0 25. Process requests for appointments.
3 2 1 0 26. Verify appointments.
3 2 1 0 27. Notify customers of changes in schedule.
3 2 1 0 28. Manage scheduling conflicts.
3 2 1 0 29. Document results.

3 2 1 0 30. Define/prioritize communication needs.
3 2 1 0 31. Specify project objectives.
3 2 1 0 32. Determine the size and specifics of the work to be completed.
3 2 1 0 33. Estimate time, materials, and capabilities needed to complete assignment.
3 2 1 0 34. Evaluate strengths and weaknesses of completed project.
3 2 1 0 35. Demonstrates ability to work and communicate effectively with diverse audiences.
3 2 1 0 36. 36. Exercises flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
3 2 1 0 37. Assumes shared responsibility for collaborative work.
3 2 1 0 38. Works appropriately and productively with others
3 2 1 0 39. Leverages the collective intelligence of groups when appropriate; and
3 2 1 0 40. Bridges cultural difference and uses differing perspective to increase innovation and the quality of work.
3 2 1 0 41. Demonstrates integrity and ethical behavior.
3 2 1 0 42. Acts responsibly with the interests of the larger community in mind (civic awareness & responsibility).
3 2 1 0 43. Uses interpersonal and problem- solving skills to influence and guide others toward a goal.
3 2 1 0 44. Leverages strengths of others to accomplish a common goal.

31097 Information Support & Services Project Management and Resource Scheduling

In addition to listed technical competencies Local Education Agencies are encouraged to develop Personalized Learning coursework representative of explicit objectives measured against specific target employment skills that are not available in other courses. These should be enumerated in addition to those listed below.

Additional competencies may reflect the particular work environment, workplace experience and/or the essential skills addressed reflective of previous coursework.

Information Support and Services Competencies

3210 1. Employ customer service principles/scientific method when working with consumers.
3210 2. Perform configuration management and evaluate software.
3210 3. Demonstrate ability to build or install components and systems of computers.
3210 4. Apply knowledge of network classifications, topologies and network operating systems.
3210 5. Manage backup and recovery systems.
3210 6. Complete general system administration tasks.
3210 7. Demonstrate sound technical writing and communication skills.

Project Management

3 2 1 0 1. Recognize different resource types (Work, Material, Cost, Budget, Personnel/Skills, Generic, etc)
3 2 1 0 2. Understand the concept of scope and demonstrate in context of assessing the size of a project.
3 2 1 0 3. Develop plans for project management and resource scheduling.
3 2 1 0 4. Identify key personnel and responsibilities for project.
3 2 1 0 5. Develop SWOT analysis [Strengths, Weaknesses, Opportunities, and Threats] for project.
3 2 1 0 6. Analyze workload of tasks and projects.
3 2 1 0 7. Determine required personnel groups and management hierarchy.
3 2 1 0 8. Determine resources necessary for project completion.
3 2 1 0 9. Determine essential tasks necessary for project completion.

3 2 1 0 10. Design potential timelines for assignments.
3 2 1 0 11. Explore appropriate technologies for project management and resource scheduling.
3 2 1 0 12. Create and present a project management and resource scheduling plan.
3 2 1 0 13. Create Gantt charts.
3 2 1 0 14. Evaluate and assign resources to tasks.
3 2 1 0 15. Implement project management skills to design and complete a collaborative project.
3 2 1 0 16. Learn various survey strategies to track project progress. principles and operation of fiber optics, analog and digital circuits.
3 2 1 0 17. Develop strategies for monitoring interconnected assignments.
3 2 1 0 18. Survey strategies for critical path scheduling.
 3 2 1 0 19.   Create strategies to manage project budgets.
3 2 1 0 20. Build survey analysis for customer satisfaction