

# Kansas Information Technology Career Cluster

# Network Systems Pathway

# 10102-Networking Systems

Name \_\_\_\_\_ ID \_\_\_\_\_

Enrollment Date  
\_\_\_\_/\_\_\_\_/\_\_\_\_

Completion Date  
\_\_\_\_/\_\_\_\_/\_\_\_\_

Credits Completed  
\_\_\_\_\_

Instructor \_\_\_\_\_ School Year \_\_\_\_\_

I certify that the student received the training in the area indicated.

**RATING SCALE:**  
3: Skilled, works independently  
2: Competent, may need assistance  
1: Received instruction, skill undeveloped  
0: No exposure, instruction or training  
Measured Competencies listed should be seen as minimums (you can add)

Student Signature \_\_\_\_\_ Date \_\_\_\_\_

Instructor Signature \_\_\_\_\_ Date \_\_\_\_\_

Competencies \_\_\_\_\_/100

## I. Networking Systems

- |         |   |         |  |         |   |
|---------|---|---------|--|---------|---|
| 3 2 1 0 | 1. Clarify specifications using questioning techniques  | 3 2 1 0 | 18. Demonstrate knowledge of LAN transmission methods and standards  | 3 2 1 0 | 32. Ensure that all multi-user aspects of the application function are operational  |
| 3 2 1 0 | 2. Develop functional requirements/specifications for high-level systems  | 3 2 1 0 | 19. Demonstrate knowledge of LAN transmission protocols  | 3 2 1 0 | 33. Install appropriate operating system hardware and software and peripherals      |
| 3 2 1 0 | 3. Gather data to identify customer/stakeholder requirement   | 3 2 1 0 | 20. Differentiate processes, services, and protocols   | 3 2 1 0 | 34. Install information system application programs in accordance with requirements |
| 3 2 1 0 | 4. Gather information using interviewing strategies   | 3 2 1 0 | 21. Demonstrate knowledge of electronic communications (e.g., LAN, Internet, remote database access, EDI).             | 3 2 1 0 | 35. Install structured cabling  |
| 3 2 1 0 | 5. Identify new application requirements within the system  | 3 2 1 0 | 22. Select a LAN/WAN technology that meets defined set of requirements   | 3 2 1 0 | 36. Assemble necessary components to complement information system design.          |
| 3 2 1 0 | 6. Identify security requirements   | 3 2 1 0 | 23. Analyze current trends and development in LANs   | 3 2 1 0 | 37. Load software with minimum disruption of process flow.                          |
| 3 2 1 0 | 7. Access needed information using company and manufacturers' references (e.g., procedural manuals, documentation, standards, work flowcharts). | 3 2 1 0 | 24. Demonstrate knowledge of local-area network (LAN) trends and issues  | 3 2 1 0 | 38. Resolve compatibility issues.   |
| 3 2 1 0 | 8. Demonstrate knowledge of the use, structure, and contents of a requirements specification document   | 3 2 1 0 | 25. Demonstrate knowledge of the principles and operation of fiber optics, analog and digital circuits.                | 3 2 1 0 | 39. Create a baseline of system/network performance.                                |
| 3 2 1 0 | 9. Develop formal specifications  | 3 2 1 0 | 26. Demonstrate knowledge of the principles and operation of wire (coaxial, fiber optics, etc.) and wireless systems   | 3 2 1 0 | 40. Identify abnormal system performance.   |
| 3 2 1 0 | 10. Review and verify specifications with customer  | 3 2 1 0 | 27. Configure a Virtual Private Network (VPN) to form the infrastructure of the WAN                                    | 3 2 1 0 | 41. Recognize environmental problems.   |
| 3 2 1 0 | 11. Demonstrate knowledge of how to use software methodologies to analyze a real-world problem.   | 3 2 1 0 | 28. Demonstrate knowledge of firewall implementation between trusted network and WAN.                                  | 3 2 1 0 | 42. Backup system   |
| 3 2 1 0 | 12. Analyze facilities' capacity planning (power cable/wire conduit).   | 3 2 1 0 | 29. Demonstrate knowledge of interconnecting LANs using WAN services   | 3 2 1 0 | 43. Develop a disaster recovery plan.   |
| 3 2 1 0 | 13. Define power conversion   | 3 2 1 0 | 30. Demonstrate knowledge of the conversion of analog speech to digital.   | 3 2 1 0 | 44. Restore system.   |
| 3 2 1 0 | 14. Develop security plan.  | 3 2 1 0 | 31. Demonstrate knowledge of the role that routers, firewalls, intrusion detection systems, and VPNs play in security. | 3 2 1 0 | 45. Choose and implement an appropriate routing protocol.                           |
| 3 2 1 0 | 15. Identify specific access levels that need to be accommodated.   |         |  | 3 2 1 0 | 46. Define scope of work to meet customer needs.                                    |
| 3 2 1 0 | 16. Match security system design to identified security requirements  |         |  | 3 2 1 0 | 47. Formulate a support plan.   |
| 3 2 1 0 | 17. Demonstrate a basic knowledge of OSI modeling.  |         |  | 3 2 1 0 | 48. Communicate and document technical support provided.                            |

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- 3 2 1 0 49. Respond to user questions.
- 3 2 1 0 50. Analyze operational problems.
- 3 2 1 0 51. Install and configure Internet software packages.
- 3 2 1 0 52. Upgrade network system software.
- 3 2 1 0 53. Develop backup process
- 3 2 1 0 54. Install surge suppression protection.
- 3 2 1 0 55. Evaluate maintenance processes and outcomes.
- 3 2 1 0 56. Fix recoverable problems
- 3 2 1 0 57. Identify problems using diagnostic tools.
- 3 2 1 0 58. Implement selected solution.
- 3 2 1 0 59. Minimize impact of problems on productivity (e.g., minimize downtime).
- 3 2 1 0 60. Run diagnostics
- 3 2 1 0 61. Select most appropriate solution.
- 3 2 1 0 62. Develop resolution plan.
- 3 2 1 0 63. Document results and solutions
- 3 2 1 0 64. Identify problems using diagnostic tools.
- 3 2 1 0 65. Perform appropriate analysis to identify problem cause
- 3 2 1 0 66. Test identified solutions.
- 3 2 1 0 67. Isolate system faults in various types of networks, cables, data modems, and carrier systems.

## Foundation & 21<sup>st</sup> Century Competencies

(lowercase letters are indicators to be considered)

### II. Pathway Foundation

#### Problem Solving and Critical Thinking

- 3 2 1 0 1. **Demonstrate knowledge of the process required to evaluate and verify the nature of a problem.**
  - a. Demonstrate knowledge of the underlying concepts of the information systems discipline.
  - b. Demonstrate knowledge of methods for achieving productivity in knowledge work.
  - c. Apply general systems theory to the analysis and development of an information system.
  - d. Identify procedures for formal problem- solving.
  - e. Demonstrate knowledge of the fundamental concept of

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information theory and organizational system processes.

- f. Identify the essential properties of information systems.

### 3 2 1 0 2. **Demonstrate knowledge of the process required to solve a problem.**

- a. Demonstrate knowledge of problem-solving steps and techniques.
- b. Summarize application planning, development, and risk management for information system.
- c. Identify potential problems in system implementation.
- d. Demonstrate knowledge of the information analysis process.
- e. Demonstrate knowledge of information technology solutions.

## III. Cluster Foundation

### Employability and Career Development

#### 3 2 1 0 1. **Demonstrate ability to evaluate and compare employment opportunities and accept employment.**

- a. Identify job advantages and disadvantages.
- b. Compare job benefits to individual needs.
- c. Compare job opportunities and responsibilities to career plan.
- d. Make decision to accept or reject employment.
- e. Write acceptance or rejection letter without error.
- f. Complete employment forms upon acceptance.

#### 3 2 1 0 2. **Demonstrate ability to seek and apply for employment.**

- a. Identify resources for finding employment.
- b. Analyze resources to determine those that are most appropriate for desired career.
- c. Compare job requirements with personal qualifications, interests, and aptitudes.
- d. Select job that matches personal qualifications, interests, and aptitudes.
- e. Identify prospective employer's submission requirements.
- f. Gather information and prepare rough draft of resume.
- g. Put resume in proper format.
- h. Write letter of application for specific job opening in correct format, without error.
- i. Gather information for application.
- j. Complete all questions on application with appropriate and honest answers.
- k. Sign and date application.
- l. Attach any supporting material required or requested.
- m. Submit full application package to employers.
- n. Dress appropriately for interview.
- o. Exhibit professional conduct before, during and after interview.
- p. Explain your qualifications and interests clearly and concisely.
- q. Answer all questions honestly and concisely.
- r. Write follow-up letter after the interview.

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### 3 2 1 0 3. **Demonstrate knowledge of career development/progression patterns in the IT industry.**

- a. Identify education and training requirements for IT career pathways.
- b. Identify professional organizations in the area of information technology.
- c. Identify benefits derived from membership in specific professional organizations.

### 3 2 1 0 4. **Demonstrate knowledge of the relationship between lifelong learning and IT career development.**

- a. Identify present and future IT employment opportunities.
- b. Demonstrate knowledge of the potential impact of IT on future society.
- c. Identify the importance of lifelong learning in the IT field.
- d. Identify certification and/or degree requirements.
- e. Identify required knowledge and skills for career ladder.
- f. Research educational and training opportunities.
- g. Identify present and future IT education and training opportunities.
- h. Design a lifelong learning plan that ties in with career advancement plan.

### 3 2 1 0 5. **Develop a personal career plan to meet career goals and objectives.**

- a. Identify career that matches individual interests and aptitudes.
- b. Develop career goal with time frame.
- c. Identify goals and objectives for reaching and advancing in career.
- d. Write a list of strategies for achieving educational requirements.
- e. Identify strategies for obtaining employment experiences.
- f. Write a time line for achieving career goals and objectives.
- g. List alternatives and potential changes.

### 3 2 1 0 6. **Explain written organizational policies, rules and procedures to help employees perform their jobs.**

- a. Identify the contents of various organizational publications.
- b. Determine the appropriate document(s) for specific job responsibilities and work assignments.
- c. Locate and identify specific organizational policy, rule or procedure to assist with a given situation.
- d. Articulate how a specific organizational policy, rule or procedure will improve a given situation.

### 3 2 1 0 7. **Identify and demonstrate positive work behaviors and personal qualities.**

- a. Demonstrate regular attendance.
- b. Follow company dress and appearance standards.
- c. Exhibit pride in work.
- d. Demonstrate leadership and teamwork.
- e. Exhibit ability to handle stress.
- f. Display initiative and open-mindedness.
- g. Participate in company orientation and training programs

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- with enthusiasm.
- h. Identify progressive strategies that will impact efficiency of job.
- i. Follow established rules, regulations and policies.
- j. Explain employer/management responsibilities.
- k. Demonstrate cost effectiveness.
- l. Demonstrate time management.
- m. Complete all tasks thoroughly.

### 3 2 1 0 8. Identify and explore career opportunities in one or more career pathways.

- a. Locate and interpret career information for at least one career cluster.
- b. Identify job requirements for three career pathways.
- c. Identify educational and credentialing requirements for three careers.
- d. Identify personal interests and aptitudes.
- e. Identify job requirements and characteristics of selected careers.
- f. Compare personal interests and aptitudes with job requirements and characteristics.
- g. Modify career goals based on results of personal interests and aptitudes with career requirements and characteristics.

### 3 2 1 0 9. Provide examples of how IT is transforming business in various industries.

- a. Demonstrate knowledge of how both PCs and larger computer systems impact people and are used in business/industry/government and other institutions.
- b. Demonstrate knowledge of the impact of computers on career pathways in business/industry (e.g., how computers have eliminated and created jobs).
- c. Demonstrate knowledge of the impact of computers on access to information and information exchange worldwide.
- d. Demonstrate knowledge of ethical issues that have surfaced in the information age.

## Ethics and Legal Responsibilities

### 3 2 1 0 1. Demonstrate appropriate knowledge and behaviors of legal responsibilities and of positive cyber-citizenship.

- a. Demonstrate knowledge of the legal issues that face information technology professionals.
- b. Identify issues and trends affecting computers and information privacy.

### 3 2 1 0 2. Demonstrate knowledge of social, ethical, and legal issues in the information technology field.

- a. Analyze the social implications of decisions made and actions taken as an information technology professional.
- b. Demonstrate knowledge of the ethical issues that face information technology professionals.
- c. Determine the practical implications of lawsuits in terms of good will, client relations, the bottom line, diversion of company resources, cash flow and accounts receivable.

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- d. Demonstrate knowledge of basic business law concepts.

### 3 2 1 0 3. Demonstrate knowledge of the rights and responsibilities of IT workers.

- a. Identify generally accepted business ethics.
- b. Demonstrate knowledge of federal laws governing discrimination and harassment.
- c. Demonstrate knowledge of key concepts related to employment discrimination.
- d. Demonstrate sensitivity to diversity, including differences in gender, culture, race, language, physical and mental challenges, and family structures.
- e. Establish procedures for maintaining the confidentiality of client information.

## Leadership and Teamwork

### 3 2 1 0 1.. Build interpersonal skills with individuals and other team members.

- a. Analyze the interdependence of empathetic listening, synergy, and consensus building.
- b. Define roles within the group decision-making process.
- c. Demonstrate knowledge of how to apply team methods to empower coworkers.
- d. Apply knowledge of group dynamics.
- e. Promote teamwork, leadership, and empowerment.
- f. Identify strategies for fostering creativity.

### 3 2 1 0 2. Demonstrate knowledge of the skills needed for leadership in the IT environment.

- a. Demonstrate knowledge of how to apply team methods to empower coworkers.
- b. Establish goals and objectives for IS.
- c. Define mission and critical success factors.
- d. Identify desired group and team behavior in an IS context.

## Safety, Health, and Environmental

### 3 2 1 0 1. Maintain a safe working environment.

- a. Demonstrate knowledge of the relationship between health, safety, and productivity.
- b. Identify health and safety standards established by government agencies.
- c. Access needed safety information using company and manufacturers' references (e.g., procedural manuals, documentation, standards, and flowcharts).
- d. and flowcharts).
- e. Ensure maintenance of a clean work area.
- f. Solve safety problems using problem-solving, decision-making, and critical thinking strategies.
- g. Demonstrate knowledge of ergonomics and repetitive strain injury.

## Systems

### 3 2 1 0 1. Demonstrate knowledge of the nature of IT in business.

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- a. Determine how business activities interface with data processing functions.
- b. Differentiate between the role of information systems within a company and their role in a global environment.
- c. Measure increases in productivity realized by the implementation of information systems.

### 3 2 1 0 2. Demonstrate knowledge of the operation of cross-functional teams in achieving project goals.

- a. Consider the benefits of using a cross-functional team in policy and procedure development.
- b. Identify desired group and team behavior in an IS context.

### 3 2 1 0 3. Explain/discuss general strategies for maximizing organizational learning and productivity in a high tech environment.

- a. Assess the importance of new technologies to future developments and to the future knowledge worker productivity.
- b. Demonstrate knowledge of methods for achieving productivity in knowledge work.
- c. Create/maintain an environment supportive of productivity.

## IV. Academic Foundations

### Language Arts Courses

### 3 2 1 0 1. Demonstrate language arts knowledge and skills required to pursue the full-range of career and post-secondary education opportunities within the IT career cluster.

- a. Listen actively.
- b. Adapt language (diction/structure, style) for audience, purpose, situation.
- c. Collect/organize oral and written information.
- d. Compose/edit (agenda, audio-visuals, bibliographies, drafts, forms/documents, notes, oral presentations, reports, technical terminology).
- e. Comprehend oral and written information (cause/effect, comparisons/contrasts, conclusions, context, purpose, charts/tables/graphs, evaluation/critiques, mood, persuasive text, sequence, summaries, technical matter).
- f. Evaluate oral and written information (accuracy, adequacy/sufficiency, appropriateness, clarity, conclusions/solutions, fact/opinion, propaganda, relevancy, validity, relationship of ideas).
- g. Identify oral and written assumptions, purpose, outcomes/solutions, and propaganda techniques.
- h. Predict outcomes/solutions from oral and written information trends.
- i. Present formal and informal speech for the purposes of discussion, supplying/requesting information, interpretation, and persuasion.
- j. Use library, text and Internet resources.

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## Communications Courses

### 3 2 1 0 2. Apply active listening skills to obtain and clarify information.

- a. Determine familiarity of discussion.
- b. Respond accordingly using appropriate verbal and nonverbal language.
- c. Explain the message given in your own words.
- d. Ask questions to seek or confirm understanding.
- e. Paraphrase and/or repeat information.
- f. Record and summarize information in written notes.
- g. Follow directions and/or respond in a positive way with clear, concise comments.

### 3 2 1 0 2. Build customer relations.

- a. Identify organizations' products and services (including own strengths as a sales agent).
- b. Recognize the importance of all customers to the business.
- c. Determine customers' individual needs.
- d. Project a professional business image (e.g., appearance, voice, grammar, word usage, enunciation, nonverbal communication).
- e. Interact with customers and colleagues in a professional (e.g., prompt, friendly, courteous, respectful, helpful, knowledgeable, and understandable) manner.
- f. Comply with established business protocols and company policies.
- g. Communicate company policies to customers.
- h. Handle merchandise returns in accordance with customer service policy.
- i. Handle customer complaints in accordance with customer service policy.
- j. Facilitate customer service through the maintenance of key information systems.
- k. Follow through on commitments made to customers (e.g., special orders, delivery specifications, new items).

### 3 2 1 0 3. Comprehend and use reading strategies to learn meaning, technical concepts, vocabulary, and follow instructions.

- a. Use reading strategy to achieve intended purpose.
- b. Identify purpose of text.
- c. Identify complexity of text.
- d. Explain purpose of text.
- e. Determine relevance, accuracy and appropriateness to purpose.
- f. Identify complexities and discrepancies in information.
- g. Analyze information presented in a variety of formats, such as tables, lists, figures.
- h. Identify key technical concepts and vocabulary.
- i. Follow all instructions as specifically given.
- j. Explain meaning of new terms, vocabulary and concepts.
- k. Interpret technical materials used.
- l. Summarize overall meaning of text.
- m. Write specific steps for applying information to task or new

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situation.

- n. Write set of directions for others sharing information learned and applying that to task or new situation.

### 3 2 1 0 4. Conduct meetings.

- a. Plan meeting.
- b. Set agenda.
- c. Schedule meeting.
- d. Reserve meeting room.
- e. Invite appropriate personnel.
- f. Identify need for outside speakers.
- g. Assign someone to take minutes.
- h. Make introductions.
- i. Invite questions, comments, and group participation.
- j. Determine appropriate action, time frame, and person accountable for identified tasks.
- k. Monitor time.
- l. Publish minutes in timely manner.

### 3 2 1 0 5. Demonstrate sensitivity in communicating with a diverse workforce.

- a. Identify factors (e.g., culture, ethnicity, equity, special/exceptional needs) that impact communication.
- b. Identify strategies for successful communication with a diverse workforce.
- c. Determine communication style appropriate for listener(s).
- d. Bridge communication styles.
- e. Establish guidelines for dealing with conflict.

### 3 2 1 0 6. Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences.

- a. Know subject matter well enough to be independent of written aids.
- b. Identify characteristics of the audience and adjust to their ability to understand.
- c. Use technical terms and concepts correctly.
- d. Use proper organization and structure to achieve coherence of major points.
- e. Identify media and visual aids appropriate to understanding of topic.
- f. Prepare visual aids and support materials for easy viewing and without error.
- g. Smoothly and efficiently operate any equipment used with support.
- h. Deliver presentation without grammatical error.
- i. Speak clearly with appropriate volume, rate and gestures while making and maintaining appropriate eye contact.
- j. Use support materials in the presentation that enhance the understanding of the topic and the interest level of the audience.
- k. Stay within presentation time parameters.
- l. Evaluate listeners' interest and receptiveness.
- m. Use verbal and nonverbal feedback strategies to engage discussion and adjust message and delivery.

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- n. Respond to questions and comments.

### 3 2 1 0 7. Interpret and use tables, charts, and figures to support written and oral communications.

- a. Compile facts and arrange in an organized manner for a table, chart or figure.
- b. Document sources of data.
- c. Determine most appropriate way to display data for effective coherence.
- d. Prepare table, chart, graph or figure for inclusion in publication or presentation.
- e. Evaluate reference or source of data for authenticity and reliability.
- f. Explain information presented in tables, charts and figures.
- g. Prepare written summary of findings expressed in tables, charts and figures.

### 3 2 1 0 8. Interpret verbal and nonverbal behaviors to enhance communication with co-workers and clients/participants.

- a. Identify verbal cues.
- b. Observe voice speed, voice quality and tone.
- c. Explain message conveyed by verbal behaviors.
- d. Identify nonverbal cues.
- e. Observe eye contact, facial expressions, posture, gestures and other body language.
- f. Explain message conveyed by nonverbal behaviors.

### 3 2 1 0 9. Locate, organize and reference written information from various sources to communicate with co-workers and clients/participants.

- a. Identify topic.
- b. Conduct search of information using card catalog, keywords, and/or search engines.
- c. Locate variety of resources such as books, journals, and magazines.
- d. Locate information from electronic forms including the Internet.
- e. Organize resources to use key information.
- f. Read and take notes from selected resources.
- g. Prepare outline that emphasizes major points with supporting data.
- h. Present information in organized, easy-to-follow manner.
- i. Prepare working bibliography according to MLA, APA, CBE, or Chicago, depending on the warranted language style.
- j. Prepare a bibliography according to MLA, APA, CBE, or Chicago, depending on the warranted language style.
- k. Use parenthetical, footnotes and endnotes text citations accurately.
- l. Follow plagiarism and copyright rules and regulations.

### 3 2 1 0 10. Use correct grammar, punctuation and terminology to write and edit documents.

- a. Organize and arrange information for effective coherence.
- b. Report relevant information in order of occurrence.

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- c. Interpret information, data, and observations correctly.
- d. Present main ideas and supporting facts.
- e. Use technical terms and concepts.
- f. Incorporate and use references effectively and accurately.
- g. Report objective and/or subjective information.
- h. Use correct grammar and sentence structure.
- i. Use correct spelling.
- j. Use correct punctuation and capitalization.
- k. Use word processing software to develop text, charts, graphs or figures correctly.
- l. Use presentation software to prepare visual support materials.
- m. Format written documents with correct font and layout for easy reading.

### Mathematics Courses

#### **3 2 1 0 1. Demonstrate mathematics knowledge and skills required to pursue the full range of career and post-secondary education opportunities within the IT career cluster.**

- a. Identify whole numbers, decimals, fractions, complex numbers, polynomials, and geometrical figures.
- b. Apply basic arithmetic (addition, subtraction, multiplication, and division) operations.
- c. Apply relational (equal, not equal, greater than, less than, etc.) and logical operators in a logical expression.
- d. Understand the relationship of data and measurements to the problem.
- e. Produce mathematical formulae, expressions, and/or sequence of solution steps from problem statements.
- f. Analyze problem statements for missing/irrelevant data, estimate/exact values, inconsistent parameters.
- g. Construct charts/tables/graphs from functions and data.
- h. Describe problem-solving techniques (e.g., successive approximation, trial and error).

### Science Courses

#### **3 2 1 0 1. Demonstrate science knowledge and skills required to pursue the full range of career and post-secondary education opportunities within the IT career cluster.**

- a. Analyze/evaluate conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables.
- b. Use computers for information processing, mathematical applications and problem-solving.
- c. Apply/use scientific methods in qualitative and quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.

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