



**Cleveland Heights – University Heights
City School District**

**Computer Networking
Technology
(Cisco Training Academy)**

COURSE OF STUDY

November, 2008

**Deborah S. Delisle
Superintendent of Schools**

STATEMENT OF APPROVAL

THIS COURSE OF STUDY HAS BEEN EXAMINED BY THE CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS BOARD OF EDUCATION.

THE DOCUMENT WAS FORMALLY APPROVED FOR ADOPTION BY THE BOARD OF EDUCATION ON NOVEMBER 3, 2008.

RESOLUTION #08-11-136

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ACKNOWLEDGEMENTS

COMPUTER NETWORKING TECHNOLOGY CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS SCHOOL DISTRICT

Sincere appreciation goes to the following individuals for their assistance and cooperation in preparing this program's course of study:

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RECOMMENDATION BY CAREER AND TECHNICAL ADVISORY COMMITTEE

COMPUTER NETWORKING TECHNOLOGY PROGRAM CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS SCHOOL DISTRICT

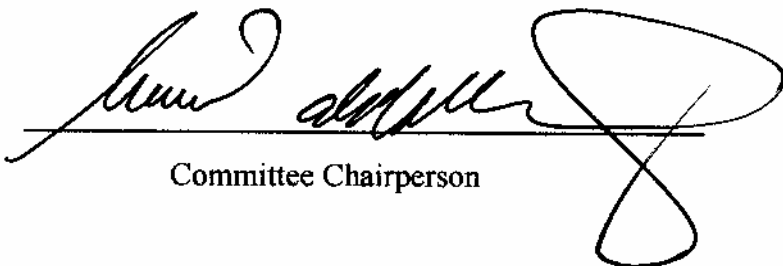
The Career Technical Advisory Committee of the Computer Networking Technology Program, Cleveland Heights-University Heights City School District has reviewed this course of study and recommends it for use as the foundation for instruction in classroom, laboratory and cooperative occupational experiences.

The developers of the course of study have considered local labor market needs and the school district's ability to offer specialized programs. The competencies found in the Computer Networking Technology Content Standards for this program have been reviewed and accepted as being congruent with our school district's philosophy and student outcome measures.

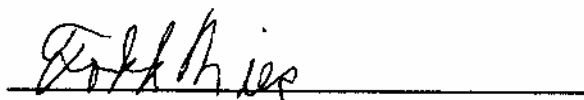
We believe that this course of study adequately and correctly focuses upon the development of technical competencies, attitudes, values and appreciation's critical to successful employment in the computer networking field. The Computer Networking Technology Program Advisory Council recommended this course of study on

6/7, 08

Date



Committee Chairperson



Business/Industry/Labor Member



Business/Industry/Labor Member

DISTRICT PHILOSOPHY

PHILOSOPHY OF EDUCATION

The educational organization, administration, development and programs within our school system are to be guided by the following premises:

1. All children are entitled to a public education that will encourage the fullest development of their individual talents.
2. Learning is essential to individual independence and the general welfare of the changing American society.
3. Effective learning develops both intellectual and emotional qualities and is for action; its proper evaluation lies in the quality of resultant activity, not mere response.
4. Organized education, a deployment of human and material resources as means toward learning, implies learning for all -
- students, teachers, administrators -- at different levels of understanding and maturity.
5. Organized education is at its best when graced with experimental attitudes and dedicated to the proposition that all issues between organization and learning shall be resolved in favor of learning.
6. All rewards and penalties adopted in the organization of education become legitimate only insofar as they assist learning.
7. For purposes of learning and growth, internal motivations are more valuable than the external, such as, grades and competition.

The primary people in our school system are first, the students, and next, the teachers. Accordingly, they will be given primary consideration in any action taken by the Board of Education.

Our school system will provide training in the basic skills.

Our school system should provide a framework in which basic problem-solving and personal adjustment methods can be learned in an orderly, phased, and wholly accessible manner.

Our school system should educate toward both responsibility and responsiveness. It should provide greatly enriched conditions for individual growth in self-awareness, in a larger social awareness, and in controlled and meaningful response both to inner and outer influences. It should strive to heighten the developing student's appreciation of the cultural and individual diversity within the human family, and improve his/her skill in working harmoniously and creatively with that diversity, since this is a rich resource for innovative and successful growth.

A major effort of the teaching-learning process should be the early development of positive self-assurance and the continuing development of individual potential to deal with a changing society, to think rationally and creatively, to be independent and productive, and to choose rewarding life activities. Thinking, creativity, independence, productivity, and activity are also characterized by individual differences. Yet they must meet external requirements, and these change with the changing society.

*Ohio Administrative Code 3301-35-02

Approved by Board of Education February 9, 1970

Revised by Board of Education January 31, 1977

Re-adopted by Board of Education January 3, 1978; March 14, 1983;
December 11, 1989

TRI-HEIGHTS CAREER PREP CONSORTIUM

MISSION STATEMENT

COMPUTER NETWORKING TECHNOLOGY PROGRAM

CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS SCHOOL DISTRICT

The mission of the Tri-Heights Career Prep Consortium is to prepare students for the ever-changing workforce by developing requisite knowledge and skills for employment and post-secondary education.

We will provide a career-focused education that integrates rigorous academics and meets the needs of all learners and the community by:

- Developing and providing quality programs that address the demands of the workplace and rapidly-changing technology
- Promoting continuous improvement of programs and services through innovation and flexibility
- Teaching relevant and necessary technical and academic skills that address workplace needs
- Developing teamwork, leadership and critical-thinking abilities
- Providing relevant work-based learning experiences for students and staff
- Expanding school partnerships with business, industry and organized labor associations
- Improving communication and collaboration among all stakeholders, students, parents, staff and the community
- Providing educational opportunities that broaden career options for adult learners
- Promoting the necessary knowledge and skills for lifelong learning.

PROGRAM DESIGN

COMPUTER NETWORKING TECHNOLOGY PROGRAM (CISCO NETWORKING ACADEMY) CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS SCHOOL DISTRICT

PROGRAM PHILOSOPHY

WE BELIEVE that as the United States economy moves from a predominantly manufacturing industry base to a predominantly service industry base, people with IT skills will be integral in keeping our businesses competitive and profitable. The Computer Networking Technology Program at Cleveland Heights High School will provide skills that guide students toward career opportunities in IT and related networking communications fields.

WE BELIEVE that parents/guardians, community, industry, and the school community should stand as examples and role models for students to not only prepare them to fulfill the needs of today's workforce but also to provide encouragement and support to those students seeking to continuing their education.

WE BELIEVE that parents, community, industry, and the school community must work together as a team to educate our children. Working as a team, we can provide positive experiences to our young adults in order to more adequately prepare them for the future.

WE BELIEVE that we must offer students the multiple opportunities to experience and resolve a variety of obstacles encountered in real-life situations. These opportunities allow for the continued development of interpersonal skills, positive work ethic, employability, and job-seeking skills.

WE BELIEVE that students need to take ownership of their education. Parents, community, and school community help guide and counsel students to make the best choices.

PROGRAM GOALS

Our program goals are to:

- meet career-technical education standards as applied to computer networking;
- meet employment standards as determined by industry and the community;
- encourage the academic and skill development of the individual to the fullest that his/her talents will permit;
- encourage the individual to participate in improving the general welfare of a changing American society, through participation in youth organizations and service activities;
- encourage each individual to internalize the desire for individual independence;

- encourage self-assurance, discipline and motivation;
- nurture the free spirit of creativity without stifling the natural individuality;
- maximize the individual's decision-making and problem-solving skills;
- heighten the developing student's appreciation of cultural, ethnic and individual diversity and improve the skill of working harmoniously and creatively within that diversity;
- provide foundation skills for students who wish to continue in computer networking and/or related fields.

PROGRAM OVERVIEW

The Computer Networking Technology program area will prepare students for careers in dealing with network systems analysis, planning, and implementation. Students will gain the necessary skills to analyze network system needs for design, installation, maintenance, and management of network systems. Skills acquired will assist students to obtain network certifications. Essential skill areas include, but are not limited to: Operations; Network Administration; Basic Network Design Theory; Network Troubleshooting; Network Security; Network Operations Center; Computer Hardware Maintenance; Network Management.

The Computer Networking Program follows a curriculum format developed by the Ohio Department of Education. The class also utilizes a sequence of competencies developed by Cisco Systems for schools participating in the Cisco Networking Academy Program. The Cisco Training Academy is a comprehensive e-learning program that prepares students with internet technology skills that are essential in a global economy. Through the Academy, students participate in web-based instruction, online assessment, student performance tracking, hands-on-labs, instructor training and support, and preparation for industry-standard certification.

POPULATION TO BE SERVED

The Computer Networking Technology program is open to all eleventh and twelfth-grade students interested in employment in a computer networking or networking-related career as long as it is not a safety hazard to self or others. Selection for participation in the program will be made regardless of gender or the economic, cultural or ethnic background of the student. Students must have completed Algebra I and Geometry. Students are expected to complete Algebra II before graduating from high school.

HOUSING OF THE PROGRAM

The Computer Networking Technology program is taught in a laboratory setting and in a classroom. Depending on student performance, experience, interpersonal skills, and availability, the student will have the opportunity to participate in work placement experiences and improvement projects conducted in various locations in the area.

SUPERVISOR OF THE PROGRAM

Coordinator of Career and Technical Education

OCCUPATIONS ADDRESSED BY THE PROGRAM

Computer Networking Technology prepares students for entry-level employment in a networking-related job or post-secondary education. Job titles include: Network Specialist; Network Operations Analyst; Communications Analyst; Network Analyst; Cable Installer; Local Area Network Technician; Network Administrator; Network Maintenance and Operations; Hardware Support/Maintenance; Wide Area Network Technician; Telecommunications Technician; Customer Service Coordinator; Hardware Installations Coordinator; Network Technician.

BASIC PROGRAM OPERATION

This program provides related classroom and laboratory experiences both in and out of school. Students attend class two fifty minute periods each day of the week. Computer Networking Technology gives the student an opportunity to develop fundamental knowledge, skills, and abilities that will enable the student to seek employment in the computer networking field.

FIELD EXPERIENCE AND/OR EARLY PLACEMENT

The Computer Networking Technology program includes an in-school laboratory and experiences in various community-based settings. These experiences are planned by the teacher, student, parents, and the employer. The instructor supervises all field experiences. The student and employer are required to keep appropriate records of experiences and competencies learned. Students are eligible for early job placement if they have met the criteria and completed the Cisco Academy training that is part of the curriculum.

ARTICULATION AGREEMENT

The Computer Networking Technology program is an approved Tech Prep program under the Ohio Department of Education. After two years of study on the high school level, a formal Agreement with Cuyahoga Community College allows students to enter the Associate Degree Program with ease and graduate with the ability to problem-solve, think critically and earn high wages. Placement exams at Tri-C will give students the opportunity to complete the Associate Degree program in less than two years. Students who have varied industry-level credentials are eligible for additional academic credit. Scholarship and intern opportunities are also available to students who participate in the Tech Prep program on the college level. Attendance at Tri-C is not mandatory. Students may choose a four-year college immediately out of high school. An articulation with Ferris State University has also been established. Based on enrollment in Computer Networking, students may test out of certain classes and receive advance placement credit.

INTEGRATED ACADEMICS

The Computer Networking Technology program provides both the eleventh-grade and twelfth-grade student with combined lab and academic classes. Students must meet Senate Bill 55 requirements for Science and complete Algebra II as part of the Tech Prep

program. Students in the program take a rigorous academic program and in some subjects, the content is taught in an applied manner.

TECHNOLOGY

Changes in technology are an integral part of our program. In response, our goal is to provide experiences that keep our students current with technology used in industry.

STUDENT LEADERSHIP

The Computer Networking Technology program encourages student participation in Business Professionals of America (BPA), Ohio Tech Prep Showcase, and Skills USA. Through these co-curricular organizations, students develop leadership skills and participate in competitive and social activities at the local, state, and national levels.

DISCLAIMER STATEMENT

This course of study conforms to all federal, state and local laws and regulations including Title IX and nondiscrimination against any student because of race, color, creed, sex, religion, citizenship, economic status, marital status, pregnancy, handicap (or other physical characteristics), age, or national origin. This policy of nondiscrimination shall also apply to otherwise qualified handicapped individuals.

Determined by Business, Industry and Labor (BIL) Panel

Essential (E) Competency:

E = Competency is needed to ensure minimal level of employability. Entry-level employees (defined as graduates of an associate degree or apprenticeship program) should be able to perform this competency for career success.

Recommended (R) Competency:

R = Competency should be included but is not essential for minimal level of employability or is related only to a subspecialty within a pathway.

Determined by Educator (EDU) Panel

Grade Level:

- 10** = by the end of grade 10
- 11** = by the end of grade 11
- 12** = by the end of grade 12
- AD** = by the end of the associate degree program

Depth:

- I** = Introduce competency
- R** = Reinforce, or add depth after introducing a competency,
OR after proficiency
- P** = Proficient or achievement of the competency; ability to apply knowledge of and/or perform the competency

Determined by Academic Review Panel

Correlated English Language Arts Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for English Language Arts* that have been determined to be embedded in corresponding technical competency

Correlated Mathematics Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Mathematics* that have been determined to be embedded in the corresponding technical competency

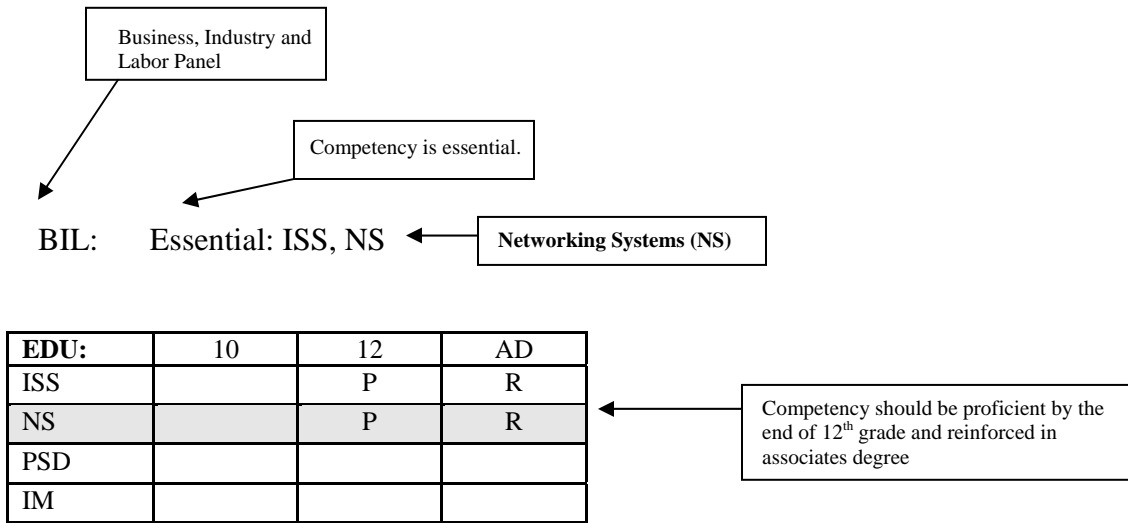
Correlated Science Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Science* that have been determined to be embedded in the corresponding technical competency

Correlated Social Studies Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Social Studies* that have been determined to be embedded in the corresponding technical competency

Unit 16: Hardware Design, Operation, Maintenance



Competency 16.1: Demonstrate proficiency in working with microcomputer systems.

TPO: *Given a diagram of an open computer, demonstrate proficiency in working with microcomputer systems, identifying and labeling the components with 80% accuracy.*

Terminal Performance Objective

Descriptors:

- 16.1.1 Identify the essential components of microcomputers and the functions of each
- 16.1.2 Discuss the principles and operation of bus concepts (e.g., VESA, EISA)
- 16.1.3 Discuss the operating systems (e.g., Windows, *NIX, DOS)
- 16.1.4 List types of input and output devices and peripherals
- 16.1.5 Discuss the principles and operation of storage devices
- 16.1.6 Connect input and output ports to peripherals

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)

Benchmarks from the English Language Arts Content Standards

SCOPE & SEQUENCE

JUNIOR YEAR PROGRAM

**COMPUTER NETWORKING TECHNOLOGY
CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS
SCHOOL DISTRICT**

Unit 1: Information Technology Basics

Webxam 82MB.01

Students should have basic proficiency in the competencies outlined in this unit prior to entry into a program focusing on Information Support and Services, Network Systems, Programming and Software Development, and Interactive Media.

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.1: Demonstrate basic knowledge of information technology history

Descriptors:

- 1.1.1 Identify significant advances in the development of computer hardware and software.
- 1.1.2 Identify major milestones in the development of information technology
- 1.1.3 Identify major individuals and their contributions to the information technology field
- 1.1.4 Discuss the speed with which computer technology has evolved (i.e., evolution time line)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). [Reading Process B, 8-10; Reading Process B, 11-12]*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.2: Demonstrate basic knowledge of the information technology impact on society

Descriptors:

- 1.2.1 Discuss how information technology impacts people and is used in business/ industry/government and other institutions
- 1.2.2 Discuss the impact of information technology on career pathways in business/industry (e.g., how computers have both eliminated and created jobs)
- 1.2.3 Describe the psychological, physical, and health risks associated with information technology (e.g., Web addiction, carpal tunnel syndrome, gaming)
- 1.2.4 Discuss possible security risks posed by the use of information technology and associated safeguards
- 1.2.5 Discuss possible effects of natural disasters on business operations
- 1.2.6 Discuss the evolution of international telecommunications standards and trends
- 1.2.7 Discuss the impact of computers on access to information and information exchange worldwide
- 1.2.8 Identify issues and trends affecting computers, information and personal privacy
- 1.2.9 Identify ethical issues that have surfaced in the information age
- 1.2.10 Explain how information technology affects the natural environment (e.g., disposal of equipment, energy use, use of natural resources)
- 1.2.11 Discuss how IT innovation has impacted society and corporate efficiency (e.g., RFID, eServices)
- 1.2.12 Discuss legislation that relates to information security (e.g., Gramm-Leach-Bliley Sarbanes-Oxley, Patriot Act, DMCA, HIPAA)

Correlated English Language Arts Academic Content Benchmarks

- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*
- *Communicate findings, reporting on the substance and process orally, visually and in writing, or through multimedia. (Research E, 8-10; Research E, 11-12)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B,11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.3: Demonstrate knowledge of information technology basics

Descriptors:

- 1.3.1 Identify classifications of computing platforms
- 1.3.2 Identify the elements of the information processing cycle (i.e., input, process, output, and storage)
- 1.3.3 Identify major hardware components and their functions
- 1.3.4 Identify types of computer storage devices
- 1.3.5 Identify types of processing (e.g., batch, interactive, event-driven)
- 1.3.6 Identify major operating system fundamentals and components

- 1.3.7 Identify the role of the binary system in information technology
- 1.3.8 Explain the role of number systems and internal data representation in information technology
- 1.3.9 Access needed information using company and manufacturers' references (e.g., procedural manuals, documentation, standards, work flowcharts, Internet/Intranet resources)
- 1.3.10 Discuss the need for asset management (e.g., hardware, software licensing)
- 1.3.11 Differentiate between asset tracking and asset management

Correlated Mathematics Academic Content Benchmarks

- *Identify subsets of the real number system. (Number B, 8-10)*
- *Apply properties of operations and the real number system, and justify when they hold for a set of numbers. (Number C, 8-10)*
- *Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. (Number D, 8-10)*
- *Compare, order and determine equivalent forms of real numbers. (Number E, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.4: Demonstrate knowledge of software associated with information technology

Descriptors:

- 1.4.1 Describe the key functions of systems software
- 1.4.2 Classify widely used software applications (e.g., word processing, database management, spreadsheet development)
- 1.4.3 Describe the range of languages used in software development
- 1.4.4 Explain relationship between data and software development (e.g., basic data structures, XML, relational databases)
- 1.4.5 Identify new and emerging classes of software
- 1.4.6 Explain intellectual property (e.g., software, images, open-source, documentation)
- 1.4.7 Explain the historical difference between packaged software and custom/in house developed software

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). [Reading Process B, 8-10; Reading Process B, 11-12]*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.5: Evaluate career opportunities in information technology

Descriptors:

- 1.5.1 Identify entry-level positions
- 1.5.2 Identify possible career pathways within regions in Ohio, the United States and globally
- 1.5.3 Compare the types of positions included in Information Support and Services, Network Systems, Programming and Software Development, and Interactive Media (e.g., compensation, benefits, travel, quality of life)
- 1.5.4 Identify types of administration/management positions available and the nature of each
- 1.5.5 Research job opportunities
- 1.5.6 Compile occupational profile
- 1.5.7 Identify factors influencing employment opportunities (e.g., outsourcing, offshore)
- 1.5.8 Identify education and training requirements for selected career pathway
- 1.5.9 Design a career path for a personal career in information technology (i.e., personal goal setting)

- 1.5.10 Design a time line for a personal career advancement in the information technology field
- 1.5.11 Identify professional organizations in the area of information technology
- 1.5.12 Identify benefits derived from membership in specific professional organizations
- 1.5.13 Identify alternative resources related to career development (e.g., trade journals, user groups, newsgroups)
- 1.5.14 Discuss the occupational trends historically and in the future.

Correlated English Language Arts Academic Content Benchmarks

- *Use documented textual evidence to justify interpretations of literature or to support a research topic. (Writing Applications D, 8-10)*
- *Use style guides to produce oral and written reports that give proper credit for sources (e.g., words, ideas, images and information) and include an acceptable format for source acknowledgement. (Research D, 8-10, Research D, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10, Research E, 11-12)*
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		

NS	P		
PSD	P		
IM	P	R	R

Competency 1.6: Explore the future of information technologies

Descriptors:

- 1.6.1 Identify new technologies relevant to information technology
- 1.6.2 Discuss the future impact of information technology on business operations (i.e., productivity, global competitiveness)
- 1.6.3 Examine the importance of new technologies to future developments and to the future knowledge of worker productivity
- 1.6.4 Identify new and emerging drivers and inhibitors of information technology change

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). [Reading Process B, 8-10; Reading Process B, 11-12]*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	

Competency 1.7: Create documents using word processing software

Descriptors:

- 1.7.1 Create documents and tables
- 1.7.2 Format text using basic and advanced formatting functions
- 1.7.3 Locate/replace text using search and replace functions
- 1.7.4 Create new forms, style sheets, and templates
- 1.7.5 Employ word processing utility tools (e.g., spell checker, grammar checker, and thesaurus)
- 1.7.6 Create tables, columns, outlines, footnotes and endnotes
- 1.7.7 Create and run macros
- 1.7.8 Assemble documents using merge functions (e.g., merge address files with letters and envelopes)
- 1.7.9 Print materials using print functions
- 1.7.10 Edit documents (i.e., version control)
- 1.7.11 Access needed information using word processing help screens

Correlated English Language Arts Academic Content Benchmarks

- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)*

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P		

Competency 1.8: Create relational databases

Descriptors:

- 1.8.1 Create a database table
- 1.8.2 Edit fields and records
- 1.8.3 Modify the design of a database table
- 1.8.4 Sort and retrieve data
- 1.8.5 Perform single- and multiple-table queries (e.g., create, run, save)
- 1.8.6 Create calculated fields
- 1.8.7 Generate customized reports for database files
- 1.8.8 Process data using database functions (e.g., structure, format, attributes, relationships, and keys)
- 1.8.9 Locate/replace data using search and replace functions
- 1.8.10 Sort data using multiple-field sorts
- 1.8.11 Add/remove filters
- 1.8.12 Create multiple criteria expressions
- 1.8.13 Create adjoined files and subforms
- 1.8.14 Create graphs and reports
- 1.8.15 Print forms, reports, and results of queries
- 1.8.16 Identify the relationship between database components
- 1.8.17 Design a database to meet the needs of an actual situation or business problem
- 1.8.18 Evaluate database design and functionality

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots and affixes to determine the meanings of complex words and subject area vocabulary. (Vocabulary E, 8-10)*
- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability. (Data A, 8-10)*
- *Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose. (Data B, 8-10)*
- *Translate information from one representation (words, table, graph or equation) to another*

representation of a relation or function. (Algebra C, 8-10)

- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this information, and set limits for acceptable solution. (Math. Process A, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P		

Competency 1.9: Create spreadsheets

Descriptors:

- 1.9.1 Design a spreadsheet in accordance with written and/or oral specifications
- 1.9.2 Retrieve existing spreadsheets
- 1.9.3 Format spreadsheets using basic formatting functions (e.g., page setup)
- 1.9.4 Perform calculations using simple formulas
- 1.9.5 Edit spreadsheets (i.e., delete, move, and copy within spreadsheets)
- 1.9.6 Create charts and graphs from spreadsheets
- 1.9.7 Group worksheets
- 1.9.8 Input/process data using spreadsheet functions
- 1.9.9 Improve spreadsheet display using enhancement features
- 1.9.10 Protect data using spreadsheet protection features
- 1.9.11 Run macros
- 1.9.12 Troubleshoot spreadsheet problems
- 1.9.13 Resolve function errors as needed
- 1.9.14 Apply advanced spreadsheet formulas
- 1.9.15 Create spreadsheet solutions to business problems
- 1.9.16 Make “what-if-“ business decisions using spreadsheets as a tool
- 1.9.17 Save and print spreadsheets
- 1.9.18 Access needed information using online help features

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)*
- *Use recursive functions to model and solve problems; e.g., home mortgages, annuities(Algebra C, 11-12)*
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability. (Data A, 8-10)*
- *Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose. (Data B, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply reasoning processes and skills to construct logical verifications or counter-examples*

to test conjectures and to justify and defend algorithms and solutions. (Math. Process D, 810)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.10: Create presentations using presentation graphics

Descriptors:

- 1.10.1 Identify hardware items that support presentation software
- 1.10.2 Compare/contrast various presentation software packages
- 1.10.3 Create computer presentation and handouts in accordance with basic principles of graphics design and visual communication
- 1.10.4 Edit presentations
- 1.10.5 Copy from one presentation to another
- 1.10.6 Insert clip art in a slide
- 1.10.7 Create WordArt objects
- 1.10.8 Create/modify a graph on a slide
- 1.10.9 Add/delete a template to a presentation
- 1.10.10 Create graphics documents using drawing and painting software programs
- 1.10.11 Add transitions to slide shows
- 1.10.12 Run slide shows manually and automatically
- 1.10.13 Save slide show presentations

Correlated English Language Arts Academic Content Benchmarks

- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10, Research E, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*
- *Give presentations using a variety of delivery methods, visual displays and technology. (Communication G, 8-10; Communication F, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.11: Apply computer office tools

Descriptors:

- 1.11.1 Analyze problems requiring solutions involving the integration of computer applications
- 1.11.2 Select appropriate productivity tool for solving specific problem
- 1.11.3 Select source application and destination application
- 1.11.4 Move/copy information between integrated applications
- 1.11.5 Link objects between applications
- 1.11.6 Embed information in applications

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.12: Demonstrate knowledge of basic data communications components and trends**Descriptors:**

- 1.12.1 Identify key communications procedures
- 1.12.2 Identify the hardware associated with telecommunications functions
- 1.12.3 Identify the uses of data communication equipment
- 1.12.4 Identify types of communications media
- 1.12.5 Identify data transmission codes and protocols
- 1.12.6 Distinguish between local area networks, wide-area networks, and other networks (e.g., wireless)
- 1.12.7 Identify data communication trends
- 1.12.8 Identify major current issues in data communications
- 1.12.9 Identify security issues

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.13: Evaluate and access information using electronic sources**Descriptors:**

- 1.13.1 Explain how to conduct searches using electronic sources (e.g., selection of search terms)
- 1.13.2 Access information using telecommunications software
- 1.13.3 Access information using teleconferencing/video conferencing techniques
- 1.13.4 Access information using portable or virtual storage technology
- 1.13.5 List the uses of simulation/modeling as an information source
- 1.13.6 Evaluate the quality and usability of electronic information

1.13.7 Download information

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)*
- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10; Research C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P		

Competency 1.14: Demonstrate proficiency with electronic mail and instant messaging

Descriptors:

- 1.14.1 Explain the basic purposes of e-mail systems
- 1.14.2 Identify basic e-mail features and options
- 1.14.3 Discuss security issues and guidelines for legal usage of e-mail
- 1.14.4 Identify contamination protection strategies for e-mail (e.g., Spam)
- 1.14.5 Identify available e-mail systems and the characteristics/features of each
- 1.14.6 Access e-mail system using login and password functions
- 1.14.7 Access e-mail messages received
- 1.14.8 Access e-mail attachments
- 1.14.9 Demonstrate e-mail etiquette
- 1.14.10 Create e-mail messages in accordance with established business standards (e.g., grammar, word usage, spelling, sentence structure, clarity, e-mail etiquette)
- 1.14.11 Send e-mail messages
- 1.14.12 Assign priority levels to messages
- 1.14.13 Create distribution lists
- 1.14.14 Employ e-mail options such as "reply requested" and "out-of-office reply"
- 1.14.15 Reply to and forward e-mail messages
- 1.14.16 Attach documents to messages
- 1.14.17 Create folders for organizing messages and documents
- 1.14.18 Save, print and delete e-mail messages/attachments
- 1.14.19 Access needed information using e-mail help facilities and tools
- 1.14.20 Discuss governance and acceptable use policy regarding email

Correlated English Language Arts Academic Content Benchmarks

- *Produce letters (e.g., business, letters to the editor, job applications) that follow the conventional style appropriate to the text, include appropriate details and exclude extraneous details and inconsistencies. (Writing Applications C, 8-10)*

- *Produce functional documents that report, organize and convey information and ideas accurately foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Process D, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P		

Competency 1.15: Install/configure software programs

Descriptors:

- 1.15.1 Identify hardware requirements (e.g., processor, memory, disk space, communications, printers, monitors)
- 1.15.2 Determine compatibility of hardware and software
- 1.15.3 Install given application/system software on various platforms in accordance with manufacturer's and business procedures
- 1.15.4 Access manufacturers' technical support resources.
- 1.15.5 Disable/uninstall software that may interfere with installation of new software
- 1.15.6 Verify compliance to licensing agreement
- 1.15.7 Differentiate between procedures for an upgrade and for a new installation
- 1.15.8 Differentiate between stand-alone and network installation procedures
- 1.15.9 Select appropriate installation options (e.g., default, customized)
- 1.15.10 Configure software to appropriate operating system settings
- 1.15.11 Troubleshoot unexpected results
- 1.15.12 Document step-by-step installation and configuration procedures
- 1.15.13 Verify software installation and operation
- 1.15.14 Convert data files if required
- 1.15.15 Configure macros, tools, and packages to accomplish simple organizational and personal tasks
- 1.15.16 Demonstrate backup, recovery, and restoration techniques

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.16: Demonstrate basic knowledge of the Internet

Descriptors:

- 1.16.1 Identify the key characteristics of the Internet
- 1.16.2 Discuss the ownership/administration of the Internet

- 1.16.3 Trace the development of Internet technology
- 1.16.4 Identify current issues related to the Internet
- 1.16.5 Identify services and tools offered on the Internet
- 1.16.6 Identify the specific strengths, weaknesses, and special features of available search engines
- 1.16.7 Explain bookmarks and their functions
- 1.16.8 Explain accepted Internet etiquette (i.e., netiquette)
- 1.16.9 Identify current uses and applications of the Internet

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.17: Access the Internet

Descriptors:

- 1.17.1 Connect to the Internet
- 1.17.2 Test Internet connection
- 1.17.3 Identify the components of Internet software
- 1.17.4 Install Internet software
- 1.17.5 Explore browser features
- 1.17.6 Download software upgrades from the Internet
- 1.17.7 Unpack files using compression software
- 1.17.8 Demonstrate acute awareness of virus protection techniques
- 1.17.9 Install/update firewalls and malware protection
- 1.17.10 List uses of mobile devices to access the Internet

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.18: Utilize Internet services

Descriptors:

- 1.18.1 Access business and technical information using the Internet
- 1.18.2 Select search engine(s) to use
- 1.18.3 Select appropriate search procedures and approaches
- 1.18.4 Locate information using search engine(s) and Boolean logic
- 1.18.5 Navigate Web sites using software functions (e.g., forward, back, go to, bookmarks)
- 1.18.6 Evaluate Internet resources (e.g., accuracy of information)
- 1.18.7 Access library catalogs on the Internet

- 1.18.8 Access commercial, government, and education resources
- 1.18.9 Bookmark Web addresses (URLs)
- 1.18.10 Download files from FTP archives
- 1.18.11 Communicate via e-mail using the Internet
- 1.18.12 Subscribe to mailing lists
- 1.18.13 Recognize the value of special interest groups and forums (e.g., blogs)
- 1.18.14 Retrieve online tools
- 1.18.15 Download/convert Internet programming files
- 1.18.16 Install/configure Web browser
- 1.18.17 Explore the multimedia capabilities of the World Wide Web
- 1.18.18 Evaluate plug-ins and helpers to the Web browser
- 1.18.19 Explore collaboration tools
- 1.18.20 Participate in online audio and video conferencing
- 1.18.21 Archive files
- 1.18.22 Compile a collection of business sites (e.g., finance and investment)
- 1.18.23 Explore electronic commerce

Correlated English Language Arts Academic Content Benchmarks

- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10)*
- *Evaluate the usefulness and credibility of data and sources, and synthesize information from multiple sources. (Research C, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P	R	R

Competency 1.19: Demonstrate knowledge of Web page basics

Descriptors:

- 1.19.1 Differentiate between a client and a server
- 1.19.2 Explain the role of browsers in reading files on the World Wide Web (e.g., text-only, hypertext)
- 1.19.3 Identify how different browsers affect the look of a Web page
- 1.19.4 Compare/contrast the features and functions of software editors available for designing Web pages
- 1.19.5 Explain how bandwidth affects data transmission and on-screen image
- 1.19.6 Discuss the characteristics and uses of plug-ins
- 1.19.7 Compare the advantages and disadvantages of running one’s own server vs. using a server provider

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	P		
NS	P		
PSD	P		
IM	P		

Competency 1.20: Install computer system (e.g., monitor, keyboard, disk drive, and printer)

Descriptors:

- 1.20.1 Identify primary PC components and the functions of each
- 1.20.2 Discuss how hardware components interact and how conflicts arise
- 1.20.3 Access needed information using manufacturers' references (e.g., procedural manuals, documentation, standards, work flowcharts)
- 1.20.4 Secure supplies and resources
- 1.20.5 Respond to error messages and symptoms of hardware failure
- 1.20.6 Install boards to support peripherals
- 1.20.7 Connect peripherals to CPU
- 1.20.8 Employ appropriate safety precautions when working with PCs
- 1.20.9 Configure system
- 1.20.10 Verify system operation
- 1.20.11 Document system installation activities
- 1.20.12 Backup system configuration
- 1.20.13 Test all applications

Unit 2: Operating Systems

Webxam 82MB.01

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	R	P
NS		P	R
PSD		I	P
IM		I	P

Competency 2.1: Explain operating systems

TPO: Using handouts, study guides or internet research, explain operating systems with 80% correct responses.

Descriptors:

- 2.1.1 Compare and contrast operating systems (ISS, PSD, IM)
- 2.1.2 Differentiate between microcomputer, minicomputer, and mainframe operating systems including handheld devices (e.g., tablets, PDA, pocket PC) [ISS, IM]
- 2.1.3 Define the role of memory management in an operating system (ISS, PSD)
- 2.1.4 Describe the system utilities used for file management
- 2.1.5 Analyze operating system interfaces
- 2.1.6 Differentiate the features among file systems (e.g., NTFS, FAT32) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)*
- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10) [Vocabulary E, 11-12]*

BIL: Essential: ISS, PSD, IM
Recommended: NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 2.2: Describe computer memory utilization

TPO: Using examples presented, describe computer memory utilization with no more than two errors.

Descriptors:

- 2.2.1 Differentiate among memory types for PCs, mainframes, minicomputers, and networks (ISS, PSD, IM)
- 2.2.2 Differentiate among the functions of extended memory, expanded memory, and cache memory (ISS, IM)
- 2.2.3 Describe the role of the relationship between memory and software applications (ISS, PSD, IM)
- 2.2.4 Describe memory management functions (e.g., contiguous allocation, paging, segmentation, virtual memory)
- 2.2.5 Describe the role of physical memory and registers
- 2.2.6 Describe the role of overlays, swapping, and partitions
- 2.2.7 Describe the role of pages and segments
- 2.2.8 Describe the role of free lists, layout, servers, interrupts and recovery from failures

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

BIL: Essential: ISS, NS, PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM			

Competency 2.3: Implement and maintain security compliance

TPO: Using a case study provided by the teacher, implement and maintain security compliance based upon the criteria specified in the assessment instrument (rubric/checklist).

Descriptors:

- 2.3.1 Implement security procedures in accordance with government standards, and business ethics (NS, ISS)
- 2.3.2 Ensure compliance with security rules, regulations, and codes (NS, ISS)
- 2.3.3 Analyze security risks (e.g., networking, software) [ISS]
- 2.3.4 Assess exposure to security issues (NS, ISS)
- 2.3.5 Implement countermeasures
- 2.3.6 Install and update virus detection and protection software (NS, PSD, ISS)
- 2.3.7 Identify sources of virus infections and remove viruses (NS, PSD, ISS)
- 2.3.8 Implement backup and disaster recovery procedures (NS, PSD, ISS)
- 2.3.9 Follow disaster plan (NS, ISS)
- 2.3.10 Provide for user authentication (e.g., assign passwords, access level) [NS, PSD, ISS]
- 2.3.11 Document security procedures (NS, ISS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P

NS		I	P
PSD			
IM			

Competency 2.4: Apply systems operations procedures

TPO: While in the classroom, apply systems operations procedures according to the criteria outlined in the classroom procedure checklist.

Descriptors:

- 2.4.1 Apply basic commands of operating system software (ISS, NS)
- 2.4.2 Apply appropriate file and disk management techniques (NS)
- 2.4.3 Access needed information using appropriate reference materials (NS)
- 2.4.4 Review automated scheduling software (NS)
- 2.4.5 Follow power-up and logon procedures (ISS, NS)
- 2.4.6 Interact with/respond to system messages using console device (NS)
- 2.4.7 Run applications/jobs in accordance with processing procedures (NS)
- 2.4.8 Identify scheduling priority in programming (NS)
- 2.4.9 Utilize audit trails (NS)
- 2.4.10 Initiate system software command structures using operating system macro facilities for computer systems
- 2.4.11 Follow logoff and power-down procedure(s) [ISS, NS]

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	R
IM			

Competency 2.5: Maintain and respond to system needs

TPO: While in the classroom, maintain and respond to system needs according to specified procedures that improve system performance.

Descriptors:

- 2.5.1 Access needed information using appropriate reference materials (ISS, NS)
- 2.5.2 Monitor system status and performance (NS)
- 2.5.3 Run diagnostics and respond to system messages (NS)
- 2.5.4 Document computer system malfunction(s) and software malfunction(s) [NS]
- 2.5.5 Install and upgrade software packages (ISS, NS)
- 2.5.6 Restore system (NS)
- 2.5.7 Review automated scheduling software (NS)
- 2.5.8 Create a query to extract information from a file or multiple files and create reports (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential: ISS, IM
Recommended: NS, PSD

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD		I	R
IM		I	P

Competency 2.6: Perform standard computer backup procedures

TPO: While in the classroom, perform standard backup procedures so no data is lost.

Descriptors:

- 2.6.1 Recognize the need for regular backup procedures (IM)
- 2.6.2 Plan a backup process (IM)
- 2.6.3 Install backup software (IM)
- 2.6.4 Perform restore operation using backup software (IM)
- 2.6.5 Run compression drive backup software and restore operation using compression drive backup software (IM)
- 2.6.6 Identify and maintain uninterruptible battery backup equipment (IM)
- 2.6.7 Install surge suppression protection (IM)
- 2.6.8 Compare/contrast full, incremental and differential backups

Unit 4: Computer User Support

Webxam 82MB.09

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 4.1: Analyze technical support needed

TPO: After reading assigned unit student will demonstrate understanding of the troubleshooting process on simulated computer problems.

Descriptors:

- 4.1.1 Identify support requirements (ISS, NS)
- 4.1.2 Apply information and data analysis techniques using problem solving and critical thinking skills (NS)
- 4.1.3 Identify support risks (i.e., security, downtime) [NS]
- 4.1.4 Examine present data and system configuration (NS)
- 4.1.5 Formulate a support plan including service-level agreements
- 4.1.6 Utilize technical assistance resources (e.g., knowledge-bases, remote control services, TAC centers, Web-based tools, and built-in help functions) [ISS, NS]

Correlated English Language Arts Academic Content Benchmarks

Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 4.2: Perform customer service

TPO: Teams will diagnose and repair an instructor prepared computer documenting the process and solution.

Descriptors:

- 4.2.1 Provide technical support (ISS)
- 4.2.2 Respond to user questions (ISS, NS)
- 4.2.3 Provide troubleshooting for hardware/software (ISS, NS)
- 4.2.4 Communicate and document technical support provided (ISS, NS)
- 4.2.5 Optimize system performance (NS)
- 4.2.6 Diagnose problems within system (ISS, NS)
- 4.2.7 Perform technical functions required by customer/user within the knowledge set of the technician (NS)
- 4.2.8 Employ technical and computer tools to perform task in the most cost-effective manner (NS)
- 4.2.9 Meet customer expectation in service delivery (e.g., SLA) [NS]
- 4.2.10 Demonstrate effective customer satisfaction skills throughout the service event life cycle (NS)

Correlated English Language Arts Academic Content Benchmarks

- Use a variety of strategies to enhance listening comprehension. (Communication A, 810; Communication A, 11-12)
- Select and use effective speaking strategies for a variety of audiences, situations and purposes. (Communication C, 11-12)
- Give informational presentations that contain a clear perspective, present ideas from multiple sources in logical sequence and include a consistent organizational structure. (Communication E, 11-12)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 4.3: Provide support and training

TPO: Ongoing throughout the semester students provide assistance to students using the computer lab.

Descriptors:

- 4.3.1 Operate help desk
- 4.3.2 Support computer users (ISS) [NS]
- 4.3.3 Train computer users (NS)
- 4.3.4 Manage user accounts (NS)
- 4.3.5 Update and maintain training and users manuals (soft or hard copies) [NS]
- 4.3.6 Demonstrate ability to guide end-users through a support solution process (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

Unit 16: Hardware Design, Operation, and Maintenance

Webxam 82MB.04

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM			

Competency 16.1: Demonstrate proficiency in working with microcomputer systems

TPO: Given a diagram of an open computer, demonstrate proficiency in working with microcomputer systems by identifying and labeling the components with 80% accuracy.

Descriptors:

- 16.1.1 Identify the essential components of microcomputers and the functions of each
- 16.1.2 Discuss the principles and operation of bus concepts (e.g., VESA, EISA)
- 16.1.3 Discuss the operating systems (e.g., Windows, *NIX, DOS)
- 16.1.4 List types of input and output devices and peripherals
- 16.1.5 Discuss the principles and operation of storage devices
- 16.1.6 Connect input and output ports to peripherals

BIL: Essential: ISS
Recommended: NS

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM			

Competency 16.2: Demonstrate proficiency in working with basic computer system architecture

TPO: After class discussion, demonstrate proficiency in working with basic computer system architecture to the satisfaction of the instructor through directed questioning.

Descriptors:

- 16.2.1 Explain the principles and operation of addresses and interrupts
- 16.2.2 Discuss the principles and operation of volatile and nonvolatile memory

Correlated English Language Arts Academic Content Benchmarks

- Apply knowledge of roots, affixes and phrases to aid understanding of content area

vocabulary. (Vocabulary D, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS	I	P	R
PSD			
IM			

Competency 16.3: Explain the purpose and importance of hardware standards

TPO: Based on Internet research for each standard-setting organization, explain the purpose and importance of hardware standards without the use of notes.

Descriptors:

- 16.3.1 Identify standard-setting bodies, OSI, IEEE, ISO, and ITU-T (formerly CCITT) standards
- 16.3.2 Explain the purpose and importance of each standard setting body

BIL: Essential: ISS, NS, IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM		I	P

Competency 16.4: Identify common computing platforms

TPO: Using handouts identify common computing platforms using classroom workstations.

Descriptors:

- 16.4.1 Identify the basic features of standard microprocessors (e.g., Intel family, RISC, AMD) [IM]
- 16.4.2 Identify standard memory types (e.g., RAM, ROM, DDRAM) [IM]
- 16.4.3 Identify standard input/output devices (e.g., ISA, EISA, PCI, USB, drive controllers, SCSI, PCMCIA, firewire) [IM]
- 16.4.4 Identify the basic features of standard operating systems (e.g., Windows Macintosh OS; Solaris, Linux, UNIX) [IM]
- 16.4.5 Identify the basic features of standard workstations (IM)

**BIL: Essential: NS
Recommended: ISS**

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			

IM			
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Competency 16.5: Analyze the computer site environment

TPO: Provided access to local codes and standards through the Internet analyze the computer lab environment according to criteria provided by local municipality.

Descriptors:

- 16.5.1 Identify environmental and structural requirements, conditions, and limitations (NS)
- 16.5.2 Identify power requirements and power supplies (NS)
- 16.5.3 Identify environmental standards and issues as they pertain to local, state, federal, global, and industry standards (NS)
- 16.5.4 Identify wiring specifications in compliance with state/local/federal codes (NS)
- 16.5.5 Identify physical site access and security (NS)

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)*
- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this information, and set limits for acceptable solution. (Math. Process A, 8-10)*

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			I
IM			

Competency 16.6: Classify computer architecture and processor types

TPO: Having available different types of computers, disassemble and identify computer architectures and processors according to criteria outlined in the curriculum.

Descriptors:

- 16.6.1 Compare/contrast the features of different microcomputer processors, minicomputer architecture and processors, and mainframe architecture and processors enterprise mid-range and personal computing
- 16.6.2 Identify internal system unit components
- 16.6.3 Compare/contrast system bus structures
- 16.6.4 Identify appropriate use of architecture alternatives

**BIL: Essential: ISS
Recommended: NS, PSD**

EDU:	10	12	AD
ISS		P	R
NS		I	R
PSD		I	R
IM			

Competency 16.7: Classify computer systems

TPO: After completion of required reading and classroom discussion classify computer systems with 80% accuracy

Descriptors:

- 16.7.1 Interpret terminology and acronyms related to computer systems architecture
- 16.7.2 Identify the input, process, output and storage hardware required in a system
- 16.7.3 Identify the basic organization of CPU architecture (e.g., Von Neumann, block diagram, data paths, control path, functional units, instruction cycles)
- 16.7.4 Compare/contrast multiprocessor architectures (e.g., single multiprocessing and distributed processing, stack, array, vector, multiprocessor, hypercube, client server, supercomputers)
- 16.7.5 Compare/contrast fundamentals of instruction-set types and architectures, including registers and RISC addressing modes
- 16.7.6 Compare/contrast of data-structure machine representations, including signed integers, character strings, stacks, records, and linked lists
- 16.7.7 Describe the principles and operation of volatile and nonvolatile memory
- 16.7.8 Discuss the principles and operation of advanced memory techniques
- 16.7.9 Identify standard input/output devices and systems, and IO subsystem
- 16.7.10 Describe the principles and operation of addresses and interrupt processing, and direct-memory-access data-handling system(s) [e.g., CICS]
- 16.7.11 Define functions of advanced memory techniques (e.g., virtual, pipeline, cache)
- 16.7.12 Demonstrate appropriate use of command sets to handle tasks in operating systems
- 16.7.13 Identify cost and performance issues in designing, building or upgrading a computer system

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonable of solutions. (Measurement F, 9-10)*
- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical*

situations. (Math. Process B, 8-10)

- Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validations to original problem situation. (Math. Process J, 11-12)

BIL: Essential: ISS

Recommended: NS, PSD

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			I
IM			

Competency 16.8: Identify and explain CPU and system components

TPO: Using materials provided along with required reading, identify and explain CPU and system components, based upon the criteria specified in the assessment instrument.

Descriptors:

- 16.8.1 Explain CPU configuration and structure
- 16.8.2 Describe the characteristics of system boards
- 16.8.3 Describe the characteristics and operation of interface cards
- 16.8.4 Describe the characteristics and operation of the PCMCIA bus (PC Card and CardBus)
- 16.8.5 Differentiate between ROM, PROM, EPROM, EEPROM, RAM (including cache)
- 16.8.6 Differentiate between synchronous and asynchronous circuits

Correlated English Language Arts Academic Content Benchmarks

- Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

BIL: Essential: ISS, NS

Recommended: PSD

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			I
IM			

Competency 16.9: Identify and describe connectivity devices

TPO: After completing the required reading identify and describe connectivity devices in an actual network environment with 80% correct responses.

Descriptors:

- 16.9.1 Recognize the appropriate use, characteristics, and operations of network interface

- devices
- 16.9.2 Discuss the characteristics and operation of analog communication devices (e.g., multiplexers, modems, DSU)
- 16.9.3 Discuss the characteristics and operation of digital communication devices. (e.g., switches, routers, firewalls, and routers)
- 16.9.4 Discuss the operation of test equipment (e.g., protocol analyzers)
- 16.9.5 Discuss wireless technologies (e.g., 802.1x, CDMA, GSM, Microwave, RFID, Bluetooth)

Correlated Mathematics Academic Content Benchmarks

- Compare order and determine equivalent forms of real numbers. (Number E, 8-10)
- Explain the effects of operations on the magnitude of quantities. (Number F, 8-10)
- Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD	I	R	R
IM			

Competency 16.10: Identify and describe peripheral equipment

TPO: After completing required reading and discussing and installing identify and describe peripheral equipment based upon the criteria specified in the assessment instrument.

Descriptors:

- 16.10.1 Describe storage system concepts and technologies
- 16.10.2 Identify interfaces between computers and other devices (e.g. Firewire, USB, IEEE, Serial ATA, SCSI)
- 16.10.3 Define printer types and related interface controllers
- 16.10.4 Define the use and operation of tape equipment and technologies
- 16.10.5 Compare and contrast RAID concepts

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			I
IM			

Competency 16.11 Evaluate cost and performance issues in designing, building or upgrading a computer system

TPO: Provided access to the internet, evaluate cost and performance issues in designing, building or upgrading a computer system according to the criteria provided in a handout.

Descriptors:

- 16.11.1 Identify and document user hardware/software and network requirements
- 16.11.2 Evaluate and recommend products and services and associated costs
- 16.11.3 Identify upgrade costs and financial risks and risk management and business continuity

Correlated Mathematics Academic Content Benchmarks

- *Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonable of solutions. (Measurement F, 9-10)*
- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validations to original problem situation. (Math. Process J, 11-12)*

BIL: Essential: ISS, NS, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM		I	P

Competency 16.12: Troubleshoot computer systems

TPO: In an actual computer lab, troubleshoot a computer system using various diagnostic tools and techniques per the required reading and handouts provided.

Descriptors:

- 16.12.1 Test system using diagnostic tools/software (NS, ISS, IM)
- 16.12.2 Identify problems in the operating system and related hardware (NS, ISS, IM)
- 16.12.3 Differentiate between hardware and software failure (NS, ISS, IM)
- 16.12.4 Update flash memory (BIOS) [(NS)]
- 16.12.5 Optimize hard drive (NS, IM)
- 16.12.6 Gather information on problem from user (NS, ISS, IM)
- 16.12.7 Repair/replace malfunctioning hardware (NS, ISS)
- 16.12.8 Reinstall software as needed (NS, ISS)
- 16.12.9 Recover data and/or files (NS)
- 16.12.10 Restore system to normal operating standards (NS, ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension. (Communication A, 1112)*

Unit 17: Fundamentals of Electronics Technology

Webxam 82MB.04

BIL: Recommended: NS

EDU:	10	12	AD
ISS			
NS		I	R
PSD			
IM			

Competency 17.1: Demonstrate an understanding of electrical fundamentals

TPO: Upon completion of a unit on electricity demonstrate an understanding of electrical fundamentals without the use of notes.

Descriptors:

- 17.1.1 Identify electrical components and schematic symbols
- 17.1.2 Identify electrical components/values using color codes and symbols
- 17.1.3 Describe of basic atomic structure and its relationship to electricity
- 17.1.4 Describe the relationship between electrical and magnetic properties
- 17.1.5 Demonstrate the electrical and magnetic properties of a magnet
- 17.1.6 Demonstrate the photoelectric effect
- 17.1.7 Demonstrate the thermocouple and Peltier effects
- 17.1.8 Discuss electrical static charge and the role of friction
- 17.1.9 Follow electrostatic discharge (ESD) preventive procedures
- 17.1.10 Identify sources of electricity
- 17.1.11 Discuss the principles and operation of electrochemical supplies
- 17.1.12 Calculate voltage, current, resistance, power, and energy
- 17.1.13 Apply Ohm's law
- 17.1.14 Apply laws
- 17.1.15 Apply power formulas
- 17.1.16 Solve electronic unit problems using metric units

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)*
- *Solve and graph linear equations and inequalities. (Algebra F, 8-10)*
- *Apply algebraic methods to represent and generalize problem situations involving vectors and matrices. (Algebra D, 11-12)*
- *Use scientific notation to express large numbers and numbers less than one. (Number A, 8-10) Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)*
- *Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents. (Number I, 8-10)*

- Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (Measurement D, 8-10)
- Apply factorials and exponents, including fractional exponents, to solve practical problems. (Number C, 8-10)

BIL: Recommended: NS

EDU:	10	12	AD
ISS			
NS		I	R
PSD			
IM			

Competency 17.2: Demonstrate knowledge of operating the various types of equipment used to test/measure DC circuits, AC circuits, solid-state devices, digital circuits, analog circuits, and microprocessors

TPO: Following guidelines presented by the teacher demonstrate knowledge of operating the various types of equipment used to test/measure DC circuits, AC circuits, solid-state devices, digital circuits, analog circuits, and microprocessors following the product manual procedures.

Descriptors:

- 17.2.1 Demonstrate the function and operation of an analog volt-ohm-meter (AVOM) [e.g., measure voltage, ohms, and amperage]
- 17.2.2 Demonstrate the function and operation of a digital volt-ohm-meter (DVOM) [e.g., measure voltage, ohms, and amperage]
- 17.2.3 Demonstrate the function and operation of a clamp-on amp meter
- 17.2.4 Demonstrate the function and operation of oscilloscopes (i.e., voltage over time)
- 17.2.5 Demonstrate the function and operation of a logic probe and logic analyzer
- 17.2.6 Measure properties of circuits using electrical test/measurement equipment
- 17.2.7 Troubleshoot a multi-component electrical circuit using electrical test/measurement equipment

Correlated Mathematics Academic Content Benchmarks

- Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonable of solutions. (Measurement F, 8-10)
- Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)
- Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)
- Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. (Geometry G, 8-10)

BIL: Recommended: NS

EDU:	10	12	AD
ISS			
NS		I	R
PSD			
IM			

Competency 17.3: Demonstrate proficiency in working with DC circuits

TPO: Using guidelines established by the teacher demonstrate proficiency in working with DC circuits according to class handout.

Descriptors:

- 17.3.1 Compute conductance of conductors and insulators
- 17.3.2 Measure resistance and current of conductors and insulators
- 17.3.3 Build series, parallel, and combination circuits
- 17.3.4 Build voltage divider circuits (loaded and unloaded)
- 17.3.5 Compute voltage divider circuits (loaded and unloaded)
- 17.3.6 Discuss the electromagnetic properties of circuits and devices
- 17.3.7 Discuss the physical and electrical characteristics of capacitors and inductors

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)*
- *Represent and compute with complex numbers. (Number E, 11-12) Solve problems situations involving derived measurements; e.g., density, acceleration. (Measurement D, 11-12)*
- *Solve and graph linear equations and inequalities. (Algebra F, 8-10)*
- *Solve systems of linear equations involving two variables graphically and symbolically. (Algebra H, 8-10)*
- *Model and solve problem situations involving direct and inverse variation. (Algebra I, 810)*
- *Describe and interpret rates of change from graphical and numerical data. (Algebra J, 8-10)*

BIL: Essential: NS

EDU:	10	12	AD
ISS			
NS		I	P
PSD			
IM			

Competency 17.4: Demonstrate proficiency in working with AC circuits

TPO: Using information obtained demonstrate proficiency in working with AC circuits meeting standards set by the teacher.

Descriptors:

- 17.4.1 Discuss the principles and operational characteristics of sinusoidal and non-sinusoidal wave forms
- 17.4.2 List known AC sources (NS)

- 17.4.3 Explain the principles and operation of various power conditioning systems (e.g., isolation transformers, surge suppressors, uninterruptible power systems) [NS]
- 17.4.4 Discuss the principles and operation of various safety grounding systems (e.g., lightning arresters, ground electrostatic discharge, fault interrupters) [NS]
- 17.4.5 Measure voltage, current, time, frequency (f), and phase relationships of AC sine wave signal

Correlated Mathematics Academic Content Benchmarks

- *Translate information from one representation (words, table, graph, or equation) to another representation of a relation or function. (Algebra C, 8-10)*
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process, 8-10)*
- *Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations. (Math. Process, 11-12) Use right triangle trigonometric relationships to determine lengths and angle measures. (Geometry I, 8-10)*
- *Compare, order and determine equivalent forms of real numbers. (Number E, 8-10)*
- *Represent transformations within a coordinate system using vectors and matrices. (Geometry B, 11-12)*

Unit 18: Networking

Webxam 82MB.05

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	R
IM			

Competency 18.1: Demonstrate knowledge of basic network classifications and topologies

TPO: Provided a list of terms and a list of definitions demonstrate knowledge of basic network classifications and topologies with 80% accuracy.

Descriptors:

- 18.1.1 Interpret basic networking terminology (ISS)
- 18.1.2 Differentiate between LANs, CANs, WANs, MANs) [ISS]
- 18.1.3 Describe how to turn LANs into CANs and WANs, MANs) [ISS]
- 18.1.4 Identify the basic point-to-point network topologies (e.g., star, ring, tree, network, irregular) [ISS]
- 18.1.5 Explain packet-switching techniques (ISS)
- 18.1.6 Identify the basic broadcast topologies (e.g., star ring, bus) [ISS]
- 18.1.7 Compare the characteristics of connection-oriented and connectionless protocols (ISS)
- 18.1.8 Identify standard high-speed networks (e.g., broadband, ISDN, SMDS, ATM, FDDI, DS3, SONET, Optical Carrier Systems) [ISS]
- 18.1.9 Identify emerging networks (e.g., ATM; ISDN; satellite nets; optic nets; integrated voice, data, and video) [ISS]
- 18.1.10 Explain network storage techniques (e.g., fiber channel, SCSI, IP, ISCSI) [ISS]

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 18.2: Demonstrate knowledge of local-area network trends and issues

TPO: Provided access to the text and the internet demonstrate knowledge of local-area network trends and issues with no more than two errors.

Descriptors:

- 18.2.1 Describe the reasons for installing a network (ISS)
- 18.2.2 Trace the evolution of networks (ISS)
- 18.2.3 Analyze current trends and developments in LANs and WANs and wireless networks (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 18.3: Demonstrate knowledge of network physical layer

TPO: Provided access to the text and instructor presentation demonstrate knowledge of network physical layer with 80% accuracy.

Descriptors:

- 18.3.1 Differentiate between baseband and broadband transmission (ISS)
- 18.3.2 Identify the criteria used in making cable selection decisions (e.g., physical properties, transmission technologies, transmission span, bandwidth, topology, security, noise immunity, installation considerations, cost)
- 18.3.3 Differentiate between cable types (e.g., coaxial, twisted-pair, optical fibers) and interfaces (ISS)
- 18.3.4 Compare/contrast a cable types (e.g., CAT5, CAT5E, CAT6+) [ISS]
- 18.3.5 Describe types of cable connectors and grounding techniques (ISS)
- 18.3.6 Describe typical cable applications (ISS)
- 18.3.7 Identify cable standards (e.g., ANSI, EIA/TIA-568, EIA/TIA-569) [ISS]
- 18.3.8 Identify the advantages and disadvantages of cabling systems (ISS)
- 18.3.9 Describe typical problems associated with cable installation (ISS)
- 18.3.10 Demonstrate cable testing and tolerance levels
- 18.3.11 Discuss the fundamentals of RF

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM			

Competency 18.4: Demonstrate knowledge of network connectivity basics

TPO: After review of the text demonstrate knowledge of network connectivity basics without the use of notes.

Descriptors:

- 18.4.1 Identify and describe the characteristics and functions of point-to-point channels, switched, and meshed network
- 18.4.2 Define the characteristics and functions of broadcast channels
- 18.4.3 Explain types of interoperability
- 18.4.4 Describe Internet, Intranet, and Extranet usage and connectivity

Correlated English Language Arts Academic Content Benchmarks

- Apply knowledge of roots and affixes to determine the meanings of complex words and subject area vocabulary. (Vocabulary E, 8-10)
- Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)
- Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary (Vocabulary D, 11-12)

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 18.5: Demonstrate knowledge of protocol concepts

TPO: Without the aid of references, demonstrate knowledge of protocol concepts according to criteria outlined in the text.

Descriptors:

- 18.5.1 Identify the advantages and disadvantages of standard protocols (ISS)
- 18.5.2 Explain the purposes of, and procedures for, encapsulation and decapsulation
- 18.5.3 Explain network protocols (e.g., IP Suite, IPX/SPX, IPSEC) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary(Vocabulary D, 11-12)

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		P	R
PSD			
IM			

Competency 18.6: Demonstrate knowledge of the Open Systems Interconnection (OSI) standard (ISO Standard 7498)

TPO: Given a layer of the OSI model, demonstrate knowledge of the Open Systems Interconnection (OSI) standard (ISO Standard 7498) according to class handout.

Descriptors:

- 18.6.1 Identify the benefits of using a layered network model
- 18.6.2 Identify the seven layers at which decisions must be made according to the OSI standard
- 18.6.3 Compare OSI stack positions and their relationship to one another
- 18.6.4 Describe actions to be performed at each of the OSI physical layers

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		P	R
PSD			
IM			

Competency 18.7: Demonstrate knowledge of communication standards for networks

TPO: Using examples provided demonstrate knowledge of communication standards for networks based with 80% accuracy.

Descriptors:

- 18.7.1 Explain digital data communication techniques and standards, including asynchronous and synchronous transmission, error detection and correction codes, and physical interfaces
- 18.7.2 Describe data-transmission basics (e.g., SYN, Syn-ack)

BIL: Essential: NS
Recommended: ISS, PSD

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD		I	R
IM			

Competency 18.8: Demonstrate knowledge of data encoding basics

TPO: Following directions provided in class demonstrate knowledge of data encoding basics with no more than two errors.

Descriptors:

- 18.8.1 Apply and convert amongst the four numbering systems: binary, octal, hexadecimal, and decimal (NS)
- 18.8.2 Demonstrate ASCII representation of characters (NS)
- 18.8.3 Demonstrate EBCDIC representation of characters (NS)
- 18.8.4 Convert ASCII characters to EBCDIC Unicode equivalents and vice versa (NS)

Correlated Mathematics Academic Content Benchmarks

- *Compare, order and determine equivalent forms of real numbers. (Number E, 8-10)*

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 18.9: Demonstrate knowledge of IP addressing schemes

TPO: Provided an IP address and subnet mask demonstrate knowledge of IP addressing schemes with 80% accuracy.

Descriptors:

- 18.9.1 Explain how names and addresses are determined for LANs (ISS)
- 18.9.2 Identify components of a network address in dotted decimal form (e.g., Class A, B, C) [ISS]
- 18.9.3 Identify the class of network to which a given address belongs (ISS)
- 18.9.4 Differentiate between default subnet masks and custom subnet masks (ISS)
- 18.9.5 Explain the relationship between an IP address and its associated subnet mask (ISS)
- 18.9.6 Create custom subnet masks to meet network design requirements (ISS)
- 18.9.7 Identify difference between classed and classless addressing schemes (ISS)

Correlated Mathematics Academic Content Benchmarks

- *Use a variety of mathematical representations flexibly and appropriately to organize, record and communicate mathematical ideas. (Math. Process E, 8-10)*

Unit 19: Network Architectures

Webxam 82MB.07

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 19.1: Demonstrate knowledge of the basics of network architecture

TPO: Upon completing classroom discussions and required reading, demonstrate knowledge of the basics of network architecture based upon the criteria specified in the assessment instrument.

Descriptors:

- 19.1.1 Describe the characteristics and uses of network components (e.g., hub, switches, routers, firewall) [ISS]
- 19.1.2 Identify LAN transmission methods (e.g., bus, pure ring, star ring topologies) [ISS]
- 19.1.3 Describe broadband and baseband transmission methods and standards (ISS)
- 19.1.4 Identify LAN transmission media (e.g., twisted pair, fiber-optic cable, wireless) [ISS]
- 19.1.5 Evaluate LAN medium-access protocols (e.g., CSMA/CD, token bus, token ring, FDDI)
- 19.1.6 Identify the components of, and relationships within, the OSI 8802 (IEEE 802) protocol suite
- 19.1.7 Identify LAN performance factors (signal attenuation, signal propagation delay)
- 19.1.8 Explain reasoning for OSI modeling (ISS)
- 19.1.9 Differentiate between a physical and logical topology (e.g., VLAN) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- *Distinguish the relationship of word meanings between pairs of words encountered in analogical statements. (Vocabulary B, 11-12)*
- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Solve increasingly complex non-routine measurement problems and check for reasonableness of results. (Measurement A, 8-10)*
- *Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. (Geometry G, 8-10)*
- *Solve problem situations involving derived measurements; e.g., density, acceleration.*

(Measurement D, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 19.2: Demonstrate knowledge of the basics of Ethernet technology

TPO: Given a list of network performance objectives and completing required reading, demonstrate knowledge of the basics of Ethernet technology with 80% correct responses on an assessment instrument.

Descriptors:

- 19.2.1 Describe differences in Ethernet topologies (ISS)
- 19.2.2 Select appropriate use of basic Ethernet configurations (e.g., simple, hub, hubs and bridges, server, switch) [ISS]
- 19.2.3 Evaluate the advantages and disadvantages of Ethernet networks as they relate to other networks (ISS)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 19.3: Demonstrate knowledge of the TCP/IP protocol suite details

TPO: Provided with two lists, one of terms and another of definitions, demonstrate knowledge of the TCP/IP protocol suite details by matching with 80% accuracy.

Descriptors:

- 19.3.1 Compare the basics of TCP/IP layers, components, and functions (ISS)
- 19.3.2 Identify how the TCP layers relate to the OSI model (ISS)
- 19.3.3 Compare and contrast TCP and IP delivery service (ISS)
- 19.3.4 Identify TCP/IP applications and services (e.g., rlogin, SMTP, telnet, FTP, DNS, NFS, VoIPs)
- 19.3.5 Explain TCP/IP protocol details (e.g., Internet addresses, ARP, RARP, IP datagram format, routing IP datagrams, TCP segment format)
- 19.3.6 Identify how the protocol suite can be used to provide prioritization and differentiation between multiple media types (e.g., QoS)

Unit 20: Network Operating Systems

Webxam 82MB.07

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 20.1: Demonstrate knowledge of the network operating systems characteristics

TPO: Upon completion of corresponding text and activities, demonstrate knowledge of the network operating systems characteristics with 80% accuracy.

Descriptors:

- 20.1.1 Identify the purposes of a network operating system (NOS) [ISS]
- 20.1.2 Identify how the components of a network operating system (i.e., server platform, network services software, network redirection software, communications software) support network operations (ISS)
- 20.1.3 Define the criteria used to evaluate network operating systems (ISS)
- 20.1.4 Identify how protocols are supported
- 20.1.5 Identify licensing requirements
- 20.1.6 Describe the characteristics of the a tiered model (e.g., peer-to-peer, thin client)
- 20.1.7 Analyze the advantages and disadvantages of the client/server model (ISS)
- 20.1.8 Compare and contrast various network operating systems (e.g., Novell NetWare, Windows, Linux, UNIX) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 20.2: Install and administer network operating system and services

TPO: Provided access to a simulated network environment, install and administer network operating system and services according to procedures outlined in class.

Descriptors:

- 20.2.1 Create domain trusts (NS)
- 20.2.2 Maintain domain controllers (NS)
- 20.2.3 Make policy changes (NS)
- 20.2.4 Employ policy templates (NS)
- 20.2.5 Create user accounts, groups, and login scripts (NS)
- 20.2.6 Control access to files and directories (NS, ISS)
- 20.2.7 Establish shared network resources (NS, ISS)
- 20.2.8 Configure network domain accounts and profiles (NS)
- 20.2.9 Implement system policies (NS)
- 20.2.10 Create roaming user profiles (NS)
- 20.2.11 Troubleshoot network performance (NS)

Unit 21: Wide-Area Networks

Webxam 82MB.06

BIL: Essential: ISS, NS
Recommended: IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM		I	P

Competency 21.1: Demonstrate knowledge of basic telecommunications and the interconnection of networks

TPO: Upon completing the required reading demonstrate knowledge of basic telecommunications and the interconnection of networks with 80% accuracy.

Descriptors:

- 21.1.1 Describe the different types of WAN connections
- 21.1.2 Describe point-to-point (PPP) interconnection
- 21.1.3 Identify basic telecommunications services (e.g., satellite, circuit switching, packet switching, wireless)
- 21.1.4 Identify communications carriers and their services
- 21.1.5 Identify the role of telecommunications tariffs

BIL: Essential: ISS, NS
Recommended: IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			P

Competency 21.2: Assess user needs for a wide-area network (WAN)

TPO: Given a scenario provided by the teacher, assess user needs for a wide-area network (WAN) based on criteria specified in a rubric.

Descriptors:

- 21.2.1 Determine availability from LAN to meet requirements of WAN
- 21.2.2 Determine the speed needed between sites to access applications
- 21.2.3 Determine the subnets needed on the WAN including VLSM
- 21.2.4 Evaluate transmission options

Correlated Mathematics Academic Content Benchmarks

- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this information, and set limits for acceptable solution. (Math. Process A, 8-10)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 21.3: Design WAN systems

TPO: After review of the text, describe the design of WAN systems as according to class handout with no more than two errors.

Descriptors:

- 21.3.1 Describe the basics of telephony (analog vs. digital signals) [NS, ISS]
- 21.3.2 Describe the conversion of analog speech to digital (NS, ISS)
- 21.3.3 Relate voice, data concepts, and video to wide-area networks (NS)
- 21.3.4 Select primary and backup data circuits (NS)
- 21.3.5 Evaluate analog and digital transmission for cost, performance, and reliability (NS)
- 21.3.6 Integrate firewalls to separate trusted network and WAN (NS)
- 21.3.7 Establish a Virtual Private Network (VPN) to form the infrastructure of the WAN (NS)
- 21.3.8 Determine routers needed to connect with LAN (NS)
- 21.3.9 Interconnect LANs using WAN services (NS)
- 21.3.10 Demonstrate cost-savings approaches (e.g., voice/video/data compression)
- 21.3.11 Discuss complexities of routing and multiple services over a WAN (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings (Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 11-12)*

Unit 22: Network Management

Webxam 82MB.09

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 22.1: Demonstrate knowledge of network management activities and procedures

TPO: After completing the required reading, demonstrate knowledge of network management activities and procedures with 80% correct response.

Descriptors:

- 22.1.1 Evaluate the basic principles of network management (NS, ISS)
- 22.1.2 Identify network system bootstrapping/initial program load (NS)
- 22.1.3 Identify server configuration and role (e.g., file server, print server or other network services (e.g., DNS, DHCP) [NS]
- 22.1.4 Determine file organization (e.g., by owners, users, and privileges) [NS]
- 22.1.5 Establish common standards for setting up and naming for the network, files, accounts, services (NS)
- 22.1.6 Determine methods for increasing performance (e.g., segmenting and balancing the network load, resolving channel and cable bottlenecks) [NS]
- 22.1.7 Define the role of the network manager (NS, ISS)
- 22.1.8 Determine procedures for performance analysis, evaluation, and monitoring (NS)
- 22.1.9 Determine procedures for network system optimization and tuning (NS)
- 22.1.10 Determine procedures for managing network assets (e.g., users, groups, printers) [NS]

Correlated English Language Arts Academic Content Benchmarks

- Compile, organize and evaluate information, take notes and summarize findings (Research B, 11-12)
- Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Model and solve problem situations involving direct and inverse variation. (Algebra I, 810)*
- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this*

information, and set limits for acceptable solution. (Math. Process A, 8-10)

- Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)
- Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretation of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)
- Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 22.2: Demonstrate knowledge of network applications

TPO: After completing research, demonstrate knowledge of network applications with 80% correct response.

Descriptors:

- 22.2.1 Describe how disk storage is shared across a network (NS, ISS)
- 22.2.2 Describe the differences among application-specific servers (e.g., database, print, communications, terminal, fax, security) [NS]
- 22.2.3 Identify the advantages of sharing backup and management of PCs across a network (NS, ISS)
- 22.2.4 Identify and manage software licensing requirements and categories (NS, ISS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS			P
NS		I	P
PSD			
IM			

Competency 22.3: Solve network applications problems

TPO: Using a classroom network, solve network applications problems with an improvement in network performance.

Descriptors:

- 22.3.1 Identify potential hardware compatibility problems (NS)
- 22.3.2 Identify precautions included in programs used on networks (e.g., self-metering, security keys, required configuration settings) [NS]

- 22.3.3 Identify network areas in which application problems could exist (e.g., memory allocation, file lock settings, resource availability) [NS]
- 22.3.4 Troubleshoot network software problems (NS)
- 22.3.5 Perform network analysis using monitoring tools

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.4: Perform network analysis, selection, and design

TPO: Using a case study provided by the teacher, perform network analysis, selection, and design, meeting standards set by assessment instrument (rubric/checklist).

Descriptors:

- 22.4.1 Gather data to identify customer requirements (NS)
- 22.4.2 Identify system and network requirements (NS)
- 22.4.3 Analyze requirements (NS)
- 22.4.4 Define scope of work to meet customer requirements (NS)
- 22.4.5 Develop functional requirements/specifications for high-level systems (NS)
- 22.4.6 Identify time, technology, and resource constraints (NS)
- 22.4.7 Identify physical requirements for system implementation (NS)
- 22.4.8 Analyze system interdependencies (NS)
- 22.4.9 Identify alternate solutions
- 22.4.10 Research product and vendor architecture and equipment specifications/limitations (NS)
- 22.4.11 Estimate impact of change request (NS)
- 22.4.12 Prepare cost/benefit/risk analysis
- 22.4.13 Perform human factors analysis
- 22.4.14 Participate in design reviews
- 22.4.15 Design prototype of system
- 22.4.16 Develop testing strategy
- 22.4.17 Prepare overall plan for integrating new processes, protocols, and equipment (NS)
- 22.4.18 Develop deployment strategies appropriate for situation
- 22.4.19 Analyze facilities' bandwidth requirements and capacity planning (power cable/wire conduit)
- 22.4.20 Revise processes/structure based on testing and certification (NS)
- 22.4.21 Identify hardware/software selection criteria (NS)
- 22.4.22 Select a LAN/WAN technology that meets defined set of requirements (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.(Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonable of solutions. (Measurement F, 8-10)*
- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validations to original problem situation. (Math. Process J, 11-12)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.5: Perform network installation procedures

TPO: In a classroom network, perform network installation procedures with no more than two errors.

Descriptors:

- 22.5.1 Access needed information using company and manufacturers' references (e.g.proceduralmanuals, documentation, standards, work flowcharts) [NS]
- 22.5.2 Assess user needs to determine which network operating systems to use (NS)
- 22.5.3 Set up/configure workstation-network connections (NS)
- 22.5.4 Set up/configure network components (e.g., routers, switches) [NS]
- 22.5.5 Install LAN (NS)
- 22.5.6 Configure file server in PC network (NS)
- 22.5.7 Construct network cables (NS)
- 22.5.8 Test network connectivity using a network analyzer

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.(Research B, 11-12)*
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 22.6: Perform network operation procedures

TPO: In a classroom network, perform network operation procedures with no more than two errors.

Descriptors:

- 22.6.1 Determine the type of wiring needed for the physical connection of the network (NS, ISS)
- 22.6.2 Connect PCs to form a network (NS, ISS)
- 22.6.3 Link mixed vendors (e.g., PC to Mac)
- 22.6.4 Document LAN configuration (NS, ISS)
- 22.6.5 Identify how the network protocols work together (NS)
- 22.6.6 Determine compatibility of various networks (NS)
- 22.6.7 Set up/configure TCP/IP services on workstations and network servers (NS)
- 22.6.8 Implement print queue in a network (NS)
- 22.6.9 Perform file-to-file copy in a network (NS, ISS)
- 22.6.10 Install/configure file server in a network

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 22.7: Perform hardware and desktop support

TPO: In a classroom network, perform hardware and desktop support according to the criteria outlined in the classroom procedure checklist.

Descriptors:

- 22.7.1 Install and use network printers (NS, ISS)
- 22.7.2 Check physical and virtual connections (NS, ISS)
- 22.7.3 Map network devices (NS)
- 22.7.4 Replace basic computer hardware (NS, ISS)

- 22.7.5 Set up system configuration (NS)
- 22.7.6 Start up/shut down network system (NS)
- 22.7.7 Install software packages (NS)
- 22.7.8 Respond to system messages (NS)
- 22.7.9 Troubleshoot system (NS)
- 22.7.10 Perform system analysis (NS)
- 22.7.11 Perform preventive maintenance (NS)
- 22.7.12 Perform software license audits
- 22.7.13 Coordinate security procedures

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.8: Perform network administration

TPO: In a classroom network, perform network administration according to the criteria outlined in the network procedure checklist.

Descriptors:

- 22.8.1 Define the role of the LAN administrator (NS)
- 22.8.2 Implement system security policies
- 22.8.3 Install network management software (NS)
- 22.8.4 Perform administration functions using LAN manager software
- 22.8.5 Perform bandwidth optimization
- 22.8.6 Respond to system messages (NS)
- 22.8.7 Troubleshoot system (NS)
- 22.8.8 Install and monitor server software applications
- 22.8.9 Perform system analysis (NS)
- 22.8.10 Perform preventive maintenance (NS)
- 22.8.11 Perform resource management (e.g., apply standards, address protocols, monitor network activity, perform trend analyses, functional verifications, audits and monitoring)
- 22.8.12 Coordinate security procedures
- 22.8.13 Document actions taken (e.g., backups, virus prevention, and software distribution) [NS]
- 22.8.14 Execute network diagnostics program for software and hardware (NS)
- 22.8.15 Apply standard policies
- 22.8.16 Establish a preventive maintenance schedule (NS)
- 22.8.17 Document and diagram network topology (NS)
- 22.8.18 Describe authentication process to network devices and for users (NS)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion*

and percent, and explain solutions. (Number G, 8-10)

- Solve increasingly complex non-routine measurement problems and check for reasonableness of results. (Measurement A, 8-10)

BIL: Essential: NS

Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.9: Perform network maintenance and diagnostics and testing

TPO: In a classroom network, perform network maintenance and diagnostics and testing according to specified procedures that improve network performance.

Descriptors:

- 22.9.1 Perform preventive maintenance (NS)
- 22.9.2 Respond to system messages (NS)
- 22.9.3 Troubleshoot system (NS)
- 22.9.4 Restore LAN operating systems (NS)
- 22.9.5 Replace LAN hardware components (NS)
- 22.9.6 Define the scope and applicability of the test (NS)
- 22.9.7 Develop a test plan (NS)
- 22.9.8 Identify needed resources (NS)
- 22.9.9 Obtain needed resources (NS)
- 22.9.10 Assess network impact (NS)
- 22.9.11 Set up test environment (NS)
- 22.9.12 Set up testing schedule (NS)
- 22.9.13 Execute testing in accordance with established plans and schedule (NS)
- 22.9.14 Document errors reported/tracked (NS)
- 22.9.15 Interpret test results (NS)
- 22.9.16 Develop central log strategy for network devices

BIL: Essential: NS

Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.10: Recommend disaster recovery and business continuity plans

TPO: Using a case study provided by the teacher, recommend disaster recovery and business continuity plans so no data is lost.

Descriptors:

- 22.10.1 Differentiate between disaster recovery and business continuity
- 22.10.2 Identify common backup devices (NS)
- 22.10.3 Identify the criteria for selecting a backup system (e.g., tape) [NS]
- 22.10.4 Establish process for archiving files (NS)
- 22.10.5 Develop and test a disaster recovery plan
- 22.10.6 Develop a business resumption plan

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

Unit 23: Security Fundamentals

Webxam 82MB.05

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		P	R

Competency 23.1: Examine the history and components of information assurance

TPO: After completing the required reading, examine the history and components of information assurance based upon the criteria specified in the assessment instrument.

Descriptors:

- 23.1.1 Identify significant advances in the development of computer security and the trend towards information assurance (NS)
- 23.1.2 Describe the evolution of major threats to computers including physical security, viruses, worms, spyware, malware, and hacker attempts and the influence this has had on the current state of information assurance (NS, ISS, PSD)
- 23.1.3 Discuss the role of the government in evolving standards and security initiatives (e.g., encryption, cryptography) [NS]
- 23.1.4 Describe the role of networking and the increased need for security and information assurance (NS, ISS)
- 23.1.5 Discuss how legislative and ethical issues and standards have impacted network security (e.g., HIPPA, GLBA, SOX) [NS, ISS]
- 23.1.6 Discuss the need for confidentiality, integrity, and availability of information (CIA) [NS, ISS, PSD]
- 23.1.7 Discuss the need for authentication and non-repudiation of information (e.g., PKI) [NS]
- 23.1.8 Illustrate security risks and associated safeguards (NS)
- 23.1.9 Examine the role of government-industry-academia partnerships in increasing the information assurance levels domestically and globally (NS)
- 23.1.10 Discuss careers and certification programs associated with security (NS, ISS, PSD)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P

NS		I	P
PSD		I	R
IM			

Competency 23.2: Describe the components associated with computer and network security systems

TPO: Provided access to all references and materials on the Internet and text, describe the components associated with computer and network security systems according to class handout in Network security.

Descriptors:

- 23.2.1 Identify and discuss biometric systems (e.g., fingerprinting, retina scans, voice analysis) [NS]
- 23.2.2 Describe two-factor authentication techniques (e.g., smart cards) [NS, ISS]
- 23.2.3 Explain the role of digital signatures in achieving information assurance and integrity (NS)
- 23.2.4 Explain the role of digital certifications in achieving information assurance (NS)
- 23.2.5 Explain the role of hashing algorithms (e.g., MD5, SHA1) in achieving information assurance and integrity (NS)
- 23.2.6 Discuss the need for policy addressing confidentiality (NS, ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

Unit 24: Secure Network Management

Webxam 82MB.05

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 24.1: Implement secure network management activities and procedures

TPO: Upon completing classroom discussions and required reading, implement secure network management activities and procedures with instructor guidance.

Descriptors:

- 24.1.1 Identify need for data protection (NS)
- 24.1.2 Identify need for network security ((NS)
- 24.1.3 Analyze network security issues (NS)
- 24.1.4 Identify security requirements (NS)
- 24.1.5 Analyze the advantages/disadvantages of firewall architectures
- 24.1.6 Select the appropriate security appliance (e.g., combined firewall routers, proxy server software solutions, dedicated software solutions, dedicated appliances)
- 24.1.7 Identify specific access levels that need to be accommodated
- 24.1.8 Determine how to protect against spoofing
- 24.1.9 Devise account administration functions to support network security (e.g., managing access control lists [ACL] of network resources)
- 24.1.10 Develop and establish best practices in security plans
- 24.1.11 Match security system design to identified security requirements
- 24.1.12 Analyze and discuss security issues and how they are mitigated with the use of software distribution management systems (e.g., patch management)

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential: NS
Recommended: ISS, PSD

EDU:	10	12	AD
ISS		I	R
NS			P

PSD			I
IM			

Competency 24.2: Describe risk analysis

Descriptors:

- 24.2.1 Discuss the balance between risk, cost, security, and implementation
- 24.2.2 Discuss a variety of security architectures and their application as they pertain to business networks
- 24.2.3 Describe risks based on vulnerability level, likelihood level, and impact level to the organization

Correlated Mathematics Academic Content Benchmarks

- *Compute probabilities of compound events, independent events, and simple dependent events. (Data J, 8-10)*
- *Make predictions based on theoretical probabilities and experimental results. (Data K, 8-10)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS			P
PSD			
IM			

Competency 24.3: Explain information technology mechanisms as they apply to a multilayer defense structure

Descriptors:

- 24.3.1 Discuss currently available intrusion prevention, detection, and mitigation systems
- 24.3.2 Illustrate auditing and log file management (e.g., archiving, clearing, sizing)
- 24.3.3 Discuss incident handling procedures, including involvement of CERT and law enforcement
- 24.3.4 Identify security risks and breaches by reviewing system logs
- 24.3.5 Discuss concepts and principles in packet inspection and filtering (e.g., firewall and routers)
- 24.3.6 Discuss concepts as they pertain to black hole lists, spam services, open relay and other types of attacks
- 24.3.7 Compare and contrast network analysis tools that identify security risks and vulnerabilities
- 24.3.8 Discuss theory of secure network management with VLANs and out-of-band networks
- 24.3.9 Discuss information asset identification and classification and disposal
- 24.3.10 Discuss concepts as they relate to human security (e.g., social engineering)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 24.4 Explain communication in a WAN environment

TPO: Provided with two lists, one of terms and another of definitions, explain communication in a WAN environment by matching with 80% accuracy.

Descriptors:

- 24.4.1 Differentiate the use of tunneling protocols both hardware and software in securing communication (e.g., L2TP, PPTP) [NS]
- 24.4.2 Describe methods for encrypting communication (e.g., IPSEC) [NS]
- 24.4.3 Describe VPNs using tunneling protocols and encrypting techniques (NS, ISS)
- 24.4.4 Explain the use of enterprise authentication management in securing communications (NS)
- 24.4.5 Discuss the role of certificate authorities (NS)

Unit 25: Wireless

Webxam 82MB.07

BIL: Essential: ISS, NS, IM
Recommended: PSD

EDU	10	12	AD
ISS		P	R
NS		P	R
PSD		I	P
IM		I	P

Competency 25.1: Explain wireless communications

TPO: After completing the required reading, explain wireless communications with 80% correct responses.

Descriptors:

- 25.1.1 Compare and contrast various wireless protocols in common use (IM)
- 25.1.2 Compare and contrast various characteristics of wireless signals (e.g., reflection, diffraction, scattering and fading) [IM]
- 25.1.3 Differentiate medium access methods used by wireless (IM)
- 25.1.4 Describe and define other wireless communication standards in use today as they apply to personal, corporate, and public use (e.g., Bluetooth) [IM]
- 25.1.5 Describe appropriate applications of wireless technologies to specific communication scenarios (IM)

Correlated English Language Arts Academic Content Benchmarks

- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Communication E, 8-10; Communication E, 11-12)*

BIL: Essential: NS
Recommended: ISS, IM

EDU	10	12	AD
ISS			I
NS		I	P
PSD			
IM		I	P

Competency 25.2: Design and implement a wireless network solution

TPO: Using a case study provided by the teacher, design and implement a wireless network solution meeting standards set by assessment instrument (rubric/checklist).

Descriptors:

- 25.2.1 Compare and contrast wireless solutions operating in ad hoc mode and infrastructure mode (NS)
- 25.2.2 Describe the various frequency ranges and associated rules in the wireless spectrum as managed by the Federal Communication Commission (FCC) [NS]
- 25.2.3 Define the Service Set Identifier (SSID) as used in wireless communications (NS)
- 25.2.4 Select and install access points, wireless NICs, antennas and other hardware and software components to provide a wireless networking solution as determined by a site and customer survey (NS)
- 25.2.5 Troubleshoot Wireless LANs using system logs, vendor provided utilities and diagnostic tools (NS)

BIL: Essential: NS**Recommended: ISS, IM**

EDU:	10	12	AD
ISS			I
NS		I	P
PSD			
IM		I	P

Competency 25.3: Evaluate security concerns specific to wireless networks and devices, and techniques for minimizing those risks

TPO: Using a case study provided by the teacher, evaluate security concerns specific to wireless networks and devices, and techniques for minimizing those risks with no more than two errors based upon the criteria specified in the assessment instrument (rubric/checklist).

Descriptors:

- 25.3.1 Define and describe the practice of “war driving” and how to mitigate this risk (NS)
- 25.3.2 Explain various methods of increasing the security of a wireless network, e.g., MAC address filtering, Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), 802.1x and RADIUS) [NS]
- 25.3.3 Compare and contrast various methods, with their strengths and weaknesses, of encrypting wireless communications (NS)
- 25.3.4 Identify security enhancements provided by IEEE 802.11(x) [NS]
- 25.3.5 Define practices and policies to prevent and detect installation of unauthorized Wireless Access Points (WAPs) [NS]

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings (Research B, 11-12)*

Unit 26: Telecommunications

Webxam 82MB.06

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 26.1: Demonstrate knowledge of transmission line applications

TPO: After completing the required reading demonstrate knowledge of transmission line applications with 80% correct response to teacher generated worksheet.

Descriptors:

- 26.1.1 Define power conversion (NS)
- 26.1.2 Discuss the principles and operation of two-wire and four-wire transmission lines (NS)
- 26.1.3 Discuss the principles and operation of coaxial cable (NS)
- 26.1.4 Discuss the principles and operation of a microwave, satellite, and laser transmissions and receptions (NS)
- 26.1.5 Discuss the principles and operation of optical, analog, and digital transmissions (NS)
- 26.1.6 Compare transmission speeds of various media (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Distinguish the relationship of word meanings between pairs of words encountered in analogical statements. (Vocabulary B, 11-12)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 26.2: Demonstrate knowledge of concepts and techniques used in working with communications systems

TPO: After completing in class discussions, demonstrations and the required reading demonstrate knowledge of concepts and techniques used in working with communications systems so that the shine will reflect a piece of paper.

Descriptors:

- 26.2.1 Discuss techniques for communication media splicing and termination (NS)
- 26.2.2 Differentiate between various communications systems (NS)
- 26.2.3 Identify the characteristics and components of cabling systems (NS)
- 26.2.4 Identify bandwidth and attenuation limitations for communications systems (e.g., fiber, copper, wireless) [NS]
- 26.2.5 Identify the characteristics of various types of light sources and light detectors used in fiber optic systems (NS)
- 26.2.6 Identify the components of fiber optic transmission systems and the function of each (e.g., CWDM, DWDM) [NS]
- 26.2.7 Discuss how data signals are transformed into light pulses (NS)
- 26.2.8 Operate a simple fiber optic data transmission system
- 26.2.9 Discuss the characteristics of multi-mode and single-mode systems (NS)

BIL: Essential: NS**Recommended: ISS**

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 26.3 Demonstrate knowledge of telecommunications network

TPO: Using a case study provided by the teacher demonstrate knowledge of telecommunication network based upon the criteria specified in the assessment instrument.

Descriptors:

- 26.3.1 Discuss the role telecommunication networks play in the contemporary business environment (NS)
- 26.3.2 Discuss how voice, data, and video inputs are converted to electromagnetic signals (NS)
- 26.3.3 Discuss advanced telecommunication broadband technologies (e.g., including frame relay and ATM, broadband, T1, T2, T3, Ethernet, IP) [NS]
- 26.3.4 Discuss the characteristics and function of ISDN and BRI , PRI signaling (NS)
- 26.3.5 Discuss mobile communications technologies, including cellular and personal communication networks (NS)
- 26.3.6 Discuss the characteristics, function and types of data compression and generational losses (NS)
- 26.3.7 Discuss the function and characteristics of DSL technologies (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

Unit 27: Information Systems (IS) Theory

Webxam 82MB.08

BIL: Essential: ISS, NS, PS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD	I	R	P
IM			

Competency 27.1: Explain systems theory

TPO: Provided a list of terms and a list of examples, explain systems theory correctly matching the terms with 80% accuracy.

Descriptors:

- 27.1.1 Explain the underlying concepts of the information systems discipline (ISS, NS)
- 27.1.2 Compare/contrast data, information, and knowledge (ISS, NS)
- 27.1.3 Compare methods for achieving productivity in knowledge work (NS)
- 27.1.4 Apply general systems theory to the analysis and development of an information system (NS)
- 27.1.5 Identify the properties of open and proprietary systems (PSD, NS)
- 27.1.6 Define the relationship between system components (NS)
- 27.1.7 Characterize the role of data representation, both non-numeric and numeric (e.g., integers, reals, errors) [ISS, PSD, NS]
- 27.1.8 Identify procedures for formal problem solving (PSD, NS)
- 27.1.9 Differentiate between the role of information systems within a company and their role in a global environment (ISS, NS)

Correlated Mathematics Academic Content Benchmarks

- *Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. (Number D, 8-10)*
- *Analyze and compare functions and their graphs using attributes, such as rates of change, intercepts and zeros. (Algebra E, 8-10)*
- *Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations. (Math. Process H, 11-12)*

Unit 30: System Installation and Maintenance

Webxam 82MB.08

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS			P
NS		I	P
PSD			
IM			

Competency 30.6: Explain backup and recovery, both on and offsite

TPO: After completing the required reading and class discussion, explain backup and recovery, both on and offsite with 80% correct response.

Descriptors:

- 30.6.1 Compile backup and recovery plan to be used by technical support group and users (NS)
- 30.6.2 Discuss backup procedures in accordance with a regular schedule (NS)
- 30.6.3 Discuss recovery procedures as needed (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.7: Troubleshoot problems

TPO: While in the classroom, troubleshoot problems according to classroom procedures.

Descriptors:

- 30.7.1 Demonstrate basic troubleshooting procedures (NS)
- 30.7.2 Diagnose computer problems (NS)
- 30.7.3 Develop resolution plan (NS)
- 30.7.4 Test identified solutions (NS)
- 30.7.5 Implement selected solution (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.8: Evaluate problem-solving processes and results

TPO: Upon completion of a networking system problem, evaluate problem-solving processes and results meeting standards set by the teacher.

Descriptors:

- 30.8.1 Evaluate problem-solving outcomes to determine whether the problem was solved as intended (NS)
- 30.8.2 Evaluate whether the process was applied in an efficient and responsible manner (NS)
- 30.8.3 Determine needed follow-up actions (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.9: Integrate software upgrades and fixes

TPO: Using guidelines governing software acquisition and upgrades, integrate software upgrades and fixes according to procedures.

Descriptors:

- 30.9.1 Identify principles governing software acquisition and upgrades (NS)
- 30.9.2 Analyze operational problems (NS)
- 30.9.3 Install software upgrades or patches as needed (NS)

Unit 44: Business Processes for IT Professionals

Webxam 82MB.02

This unit details the methodology for the development, implementation, and monitoring of an IT-related work product or system. It is strongly recommended that the process oriented competencies in this unit be taught in conjunction with (not separate from) the technical, workplace, and academic skills outlined in other units.

Initiation/Planning Phase- Project Planning

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	P	R
NS		P	R
PSD	I	P	R
IM		P	R

Competency 44.1: Demonstrate knowledge of project planning methodology

TPO: Given a scenario, prepare a detailed project proposal to demonstrate knowledge of project planning methodology which meets guidelines set forth by instructor.

Descriptors:

- 44.1.1 Define terms associated with project planning
- 44.1.2 Identify steps associated with project planning
- 44.1.3 Identify methodologies associated with project planning
- 44.1.4 Define the project's contribution to business needs
- 44.1.5 Identify stakeholders and decision makers
- 44.1.6 Define the scope of the project
- 44.1.7 Evaluate project requirements
- 44.1.8 Develop task list (e.g., work breakdown structures)
- 44.1.9 Prioritize tasks according to business needs
- 44.1.10 Identify required resources and budget
- 44.1.11 Develop initial project management flowchart
- 44.1.12 Identify critical milestones
- 44.1.13 Evaluate risks
- 44.1.14 Prepare contingency plan
- 44.1.15 Develop a method of evaluation
- 44.1.16 Explain alternative development methodologies

Correlated English Language Arts Academic Content Benchmark

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E. 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*
- *Generalize and explain patterns and sequences in order to find the next term and the nth term. (Algebra A, 8-10)*

Requirements Analysis Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.2: Conduct requirements analysis

TPO: Provided a business scenario, conduct a requirements analysis using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.2.1 Identify business needs/expectations (PSD, NS, IM, ISS)
- 44.2.2 Analyze use of product or system (PSD, NS, IM, ISS)
- 44.2.3 Specify functional requirements (NS, IM, ISS)
- 44.2.4 Specify data requirements (NS, IM, ISS)
- 44.2.5 Describe how processes and data support business expectations (PSD, NS, IM, ISS)
- 44.2.6 Develop test criteria and plans (NS, IM, ISS)
- 44.2.7 Revise documentation prepared in initiation/planning phase as needed (NS, IM, ISS)
- 44.2.8 Generate task status report (NS, IM, ISS)
- 44.2.9 Track critical milestones (NS, IM, ISS)
- 44.2.10 Participate in project phase review (NS, IM, ISS)
- 44.2.11 Report project status (NS, IM, ISS)

Correlated English Language Arts Academic Content Benchmarks

- Use revision strategies to improve the style, variety of sentence structure, clarity of controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas. (Writing Process C, 8-10)
- Use a variety of strategies to revise content, organization and style, and to improve word choice, sentence variety, clarity and consistency of writing. (Writing Process C, 8-10; Writing Process C, 11-12)
- Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)
- Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)
- Construct convincing arguments based on analysis of data and interpretation of graphs (Data F, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
- Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data B, 11-12)
- Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)
- Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)
- Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.3: Demonstrate knowledge of the requirements analysis phase

TPO: Provided a business scenario demonstrate knowledge of the requirements analysis phase using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.3.1 Identify business expectations (PSD, ISS, NS, IM)
- 44.3.2 Explain how implementation will impact the environment (NS, IM)
- 44.3.3 Explain budget and time restraints (ISS, NS, IM)
- 44.3.4 Explain how the business environment impacts requirements (e.g., risks and rewards)

[NS, IM]

44.3.5 Explain how internal and external forces impact project requirements (ISS, NS, IM)

44.3.6 Explain how legal and regulatory issues impact project requirements (NS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). [Reading Process B, 11-12]*

Design/Development Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.4: Identify current technical environment

TPO: Examine your computer to identify your current technical environment and list ten internal and ten external components.

Descriptors:

44.4.1 Identify current internal and external technical resources (NS, ISS, IM)

44.4.2 Identify current internal and external technology (PSD, NS, ISS, IM)

44.4.3 Identify internal and external processes (NS, ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.5: Demonstrate knowledge of design alternatives and options

TPO: Given a written situation involving equipment purchase, demonstrate knowledge of design alternatives and options as part of a case study.

Descriptors:

44.5.1 Determine return on investment (ROI) [e.g., cost-benefit analysis] [NS, ISS, IM]

44.5.2 Explain Total Cost of Ownership (TCO) [PSD, NS, ISS, IM]

44.5.3 Define risks and rewards for each option (NS, ISS, IM)

44.5.4 Explain the components of “build versus buy” (PSD, NS, ISS, IM)

44.5.5 Explain processes to compare design versus requirements (NS, ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)
- Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD	I	R	P
IM		I	P

Competency 44.6: Demonstrate knowledge of how systems and products are developed

TPO: Provided a business scenario demonstrate knowledge of how systems and products are developed using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.6.1 Define components that go into the development plan (e.g., hardware, software, communications) [PSD, ISS, NS, IM]
- 44.6.2 Explain what makes a good development plan (e.g., end-user involvement, programming code reviews) [PSD, ISS, NS, IM]
- 44.6.3 Identify documentation requirements in initiation/planning phase as needed (ISS, NS, IM)
- 44.6.4 Explain project status report (ISS, NS, IM)
- 44.6.5 Define purpose of critical milestones and paths (ISS, NS, IM)
- 44.6.6 Discuss need for project phase review (ISS, NS, IM)
- 44.6.7 Report project status (ISS, NS, IM)

Correlated English Language Arts Academic Content Benchmarks

- Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- Use precise mathematical language and notations to represent problem situations and mathematical ideas. (Math. Process F, 8-10)
- Write clearly and coherently about mathematical thinking and ideas. (Math. Process G, 810)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 44.7: Discuss solutions versus requirements

TPO: Provided a business scenario, discuss solutions versus requirements using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.7.1 Explain how unit testing is used to validate requirements (PSD, ISS, IM)
- 44.7.2 Explain the purpose of technical review (ISS, IM)
- 44.7.3 Explain the purpose of end-user solution review (ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- *Describe sampling methods and analyze the effects of method chosen regarding how well the resulting sample represents the population. (Data G, 8-10)*

Quality Assurance and Testing

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.8: Explain quality assurance processes

TPO: Provided a business scenario, explain quality assurance processes using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.8.1 Discuss the historical evolution of quality assurance initiatives (ISS, NS, IM)
- 44.8.2 Interpret quality management terminology (NS)
- 44.8.3 Identify the role of quality within the organization (ISS, NS, IM)
- 44.8.4 Identify the features and benefits of quality planning (PSD, NS)
- 44.8.5 Discuss the relationship among organizational structures, policies, procedures and quality assurance (NS, IM)
- 44.8.6 Identify successful efforts by industry to improve quality and/or reduce costs (NS)
- 44.8.7 Differentiate between prevention and detection (ISS, NS)

- 44.8.8 Differentiate between variable and attribute data
- 44.8.9 Identify types of control charts
- 44.8.10 Explain how statistical techniques are used to control quality

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)
- Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
- Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlations and variability. (Data B, 11-12)
- Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions (Data C, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		P	R

Competency 44.9: Demonstrate knowledge of the testing environment

TPO: Examine a computer repair facility to demonstrate knowledge of the testing environment identify the technical environment and list ten internal and ten external components.

Descriptors:

- 44.9.1 Identify the purpose of integration testing (ISS, NS)
- 44.9.2 Identify the purpose of system testing (ISS, NS)
- 44.9.3 Identify the purpose of security testing (ISS, NS)
- 44.9.4 Identify the purpose of acceptance testing (PSD, ISS, NS)

Implementation Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.10: Describe key components of an implementation plan (e.g., communication, business continuity plan)

TPO: Provided a business scenario describe key components of an implementation plan using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.10.1 Identify turn-back points (e.g., go or no-go) [NS, IM, ISS]
- 44.10.2 Identify new work processes and procedures (PSD, NS, IM, ISS)
- 44.10.3 Identify steps all business units must take to implement (NS, IM, ISS)
- 44.10.4 Identify decision criteria for retiring old solution (i.e., displaced technology) [NS, IM, ISS]

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD		P	R
IM		P	R

Competency 44.11: Explain the value a communication plan can provide to implementation

TPO: Provided with a business scenario, demonstrate knowledge of the testing environment by preparing a test plan with 10 items to test.

Descriptors:

- 44.11.1 Identify communication vehicles
- 44.11.2 Identify components of a communication plan
- 44.11.3 Explain the importance of audience when developing a communication plan
- 44.11.4 Describe types of communication channels (e.g., formal vs. informal)
- 44.11.5 Define stakeholder relationships (e.g., customer, employers, shareholders, suppliers)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use effective speaking strategies for a variety of audiences, situations and purposes. (Communication C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.12: Explain the value a training plan can provide to implementation

TPO: Provided a business scenario, explain the value a training plan can provide to implementation using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.12.1 Identify components of training plan (ISS, IM, NS)
- 44.12.2 Identify common training methodologies (e.g., computer-based, hands on) [ISS, IM, NS]
- 44.12.3 Identify strengths and weaknesses of each methodology (ISS, IM, NS)
- 44.12.4 Identify functions of a training plan (PSD, ISS, IM, NS)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use effective speaking strategies for a variety of audiences, situations and purposes. (Communication C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD		I	P
IM		I	P

Competency 44.13: Explain how business continuity plans (e.g., disaster recovery, roll-back) interrelate with implementation plans

TPO: After completion of the required reading and a classroom discussion explain how business continuity plans (e.g., disaster recovery, roll-back) interrelate with implementation plans according to industry standards.

Descriptors:

- 44.13.1 Describe purpose and components of a roll-back plan (e.g., go-no-go) [IM, NS]
- 44.13.2 Describe purpose and components of a fall-back plan (e.g., disaster recovery plan) [PSD, IM, NS]
- 44.13.3 Describe purpose and components of a business continuity plan (IM, NS)

Maintenance/Operations Phase

BIL: Essential: ISS NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.14: Demonstrate knowledge of information technology operations and maintenance Key Indicators

TPO: Provided a business scenario demonstrate knowledge of information technology operations and maintenance key indicators using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.14.1 Describe maintenance and operations phase (ISS, NS, IM)
- 44.14.2 Identify systems operations (ISS, IM)
- 44.14.3 Define problem and modification process (PSD, ISS, IM)
- 44.14.4 Define steps to maintain system (ISS, IM)
- 44.14.5 Revise previous documentation as needed (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.15: Explain the role of maintenance as part of the IT function

TPO: Provided a business scenario explain the role of maintenance as part of the IT function using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.15.1 Define components of maintenance contracts (PSD, ISS, IM, NS)
- 44.15.2 Define upgrade process (ISS, IM, NS)
- 44.15.3 Define Service Level Agreements (SLAs) [ISS, IM, NS]

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.16: Define components of incidence and problem management

TPO: Provided a business scenario define components of incidence and problem management using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.16.1 Define escalation process (NS, IM)
- 44.16.2 Explain different methodologies for event notification (e.g., paging, e-mail) [ISS, PSD, NS, IM]

44.16.3 Explain support contract (ISS, NS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.17: Identify components of change management process

TPO: Provided a business scenario identify components of change management process using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.17.1 Define the change and value of change (ISS, IM, NS)
- 44.17.2 Define when to do change (ISS, IM, NS)
- 44.17.3 Explain what change entails (ISS, IM, NS)
- 44.17.4 Explain the impact of change (ISS, PSD, NS)
- 44.17.5 Contact all affected parties (ISS, IM, NS)
- 44.17.6 Identify back-up plan (IM, ISS, NS)

Unit 45: Business Law and Legal Issues

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	R	P
NS		P	R
PSD	I	P	R
IM		P	R

Competency 45.1: Define intellectual property rights covered by intellectual law

TPO: After completing the required reading, define intellectual property rights covered by intellectual law, with 80% correct response.

Descriptors:

- 45.1.1 Distinguish among the various forms of intellectual property rights (e.g., copyright, patent, trademark, trade secrets) [ISS]
- 45.1.2 Define plagiarism (ISS)
- 45.1.3 Define authorship (ISS)
- 45.1.4 Define work made for hire (ISS)
- 45.1.5 Define fair use (ISS)
- 45.1.6 Differentiate the rights granted under copyright, patent, and trademark (ISS)
- 45.1.7 Identify the rights related to electronic imagery (ISS)
- 45.1.8 Discuss consequences of violation of copyright trademark and patent law (ISS)
- 45.1.9 Identify the liability for invasion of privacy (ISS)
- 45.1.10 Identify the liability for slander and libel (ISS)
- 45.1.11 Identify legal terms related to IT (ISS)
- 45.1.12 Discuss licensing issues (ISS)
- 45.1.13 Discuss confidentiality issues and their liability implications

Correlated English Language Arts Academic Content Benchmarks

- *Use style guides to produce oral and written reports that give proper credit for sources (e.g., words, ideas, images, information) and include an acceptable format for source acknowledgement. (Research D, 8-10; Research D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 45.2: Describe the components of contracts

TPO: After comparing several contracts, describe the components of contracts with the use of notes.

Descriptors:

- 45.2.1 Define statement of work (NS, IM, ISS)
- 45.2.2 Define duration (NS, ISS, IM)
- 45.2.3 Define liabilities (NS, ISS, IM)
- 45.2.4 Define termination clause (NS, ISS, IM)
- 45.2.5 Define service level agreements (PSD, NS, ISS, IM)
- 45.2.6 Define exclusions (NS, ISS, IM)
- 45.2.7 Define warranties ((NS, ISS, IM)
- 45.2.8 Explain dispute resolution (NS, ISS, IM)
- 45.2.9 Define terms and conditions (NS, ISS, IM)

BIL: Essential: ISS NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 45.3: Identify current regulatory issues (e.g., HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, NSA–National Security Act, Homeland Security)

TPO: After completing the required reading, identify current regulatory issues (e.g., HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, NSA–National Security Act, Homeland Security) with 80% correct response.

Descriptors:

- 45.3.1 Explain the impact of regulatory compliance issues on the design and development process (PSD, NS, ISS, IM)
- 45.3.2 Define/explain the impact of non-compliance to the company/organization (PSD, NS, IM, ISS)
- 45.3.3 Explain risk of non-compliance to the company/organization (PSD, NS, ISS, IM)

Unit 46: Technical Writing and Documentation

Webxam 82MB.03

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.1: Evaluate technical writing requirements

TPO: Using a case study provided by the teacher, evaluate technical writing requirements based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.1.1 Define/prioritize communication needs (PSD, ISS, IM)
- 46.1.2 Resolve conflicting requirements (ISS)
- 46.1.3 Specify project objectives (PSD, ISS)
- 46.1.4 Determine the size and specifics of the work to be completed (PSD, ISS)
- 46.1.5 Estimate time, materials, and capabilities needed to complete assignment (ISS)
- 46.1.6 Identify criteria for successful completion of project (ISS)
- 46.1.7 Evaluate strengths and weaknesses of completed project (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.2: Write technical reports

TPO: Using a case study provided by the teacher, write a technical report based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.2.1 Determine audience (PSD, ISS, IM)
- 46.2.2 Access needed information using standard references and sources (ISS, IM)

- 46.2.3 Identify type of report needed (ISS, IM)
- 46.2.4 Compile relevant data (ISS, IM)
- 46.2.5 Organize data into charts and graphs (ISS, IM)
- 46.2.6 Analyze data (ISS, IM)
- 46.2.7 Draw conclusions from data analysis (ISS, IM)
- 46.2.8 Outline report (ISS, IM)
- 46.2.9 Draft report (ISS, IM)
- 46.2.10 Edit report (e.g., check spelling, grammar, punctuation, sentence structure, accuracy of content) [ISS, IM]
- 46.2.11 Review report with peers (ISS, IM)
- 46.2.12 Revise report as needed based on peer feedback (ISS, IM)
- 46.2.13 Proofread revised report (ISS, IM)
- 46.2.14 Present reports (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Determine the usefulness of organizers and apply appropriate pre-writing tasks. (Writing Process B, 8-10)*
- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*
- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure. (Writing Applications D, 11-12)*
- *Use revision strategies to improve the style, variety of sentence structure, clarity of controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas. (Writing Process C, 8-10; Writing Process C, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Process D, 8-10)*
- *Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics. (Writing Process F, 8-10)*

Correlated Mathematics Academic Content Benchmarks

- *Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (Data D, 8-10)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)*
- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)*
- *Describe sampling methods and analyze the effects of method chosen regarding how well the resulting sample represents the population. (Data G, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data B, 11-12)*

- *Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions.(Data C, 11-12)*
- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 810)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.3: Conduct technical research

TPO: Using a case study provided by the teacher, conduct technical research, based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.3.1 Identify target audience (PSD, ISS, IM)
- 46.3.2 Define research questions (ISS, IM)
- 46.3.3 Determine priorities for the information that should be gathered (ISS, IM)
- 46.3.4 Identify potential sources of information (ISS, IM)
- 46.3.5 Target audience/user group as a key information source (ISS, IM)
- 46.3.6 Identify subject matter experts (ISS, IM)
- 46.3.7 Evaluate potential sources of information based on established criteria (e.g., affordability, relevance) [ISS, IM]
- 46.3.8 Conduct interviews with selected human information sources (ISS)
- 46.3.9 Gather information from selected print and electronic sources (ISS)
- 46.3.10 Determine the accuracy and completeness of the information gathered (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)*
- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10)*
- *Evaluate the usefulness and credibility of data and sources, and synthesize information from multiple sources. (Research C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	R	P
IM	I	P	R

Competency 46.4: Design technical documentation

TPO: Using a case study provided by the teacher, design technical documentation based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.4.1 Define purpose of documentation (PSD, ISS)
- 46.4.2 Specify standards for documentation, including critical success criteria (ISS)
- 46.4.3 Identify delivery options (ISS)
- 46.4.4 Evaluate cost-effectiveness of each delivery option (ISS)
- 46.4.5 Select tools appropriate for task purpose (ISS)
- 46.4.6 Plan information flow (ISS)
- 46.4.7 Select writing style and tone appropriate for given documentation (ISS)
- 46.4.8 Determine level of detail needed (ISS)
- 46.4.9 Identify visuals appropriate for given documentation (ISS)
- 46.4.10 Provide feedback on design to development team/individual (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience. (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Determine the usefulness of organizers and apply appropriate pre-writing tasks. (Writing Process B, 8-10)*
- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.5: Develop technical documentation

TPO: Using a case study provided by the teacher, develop technical documentation based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.5.1 Determine audience (ISS, IM)
- 46.5.2 Identify parameters (ISS, IM)
- 46.5.3 Interpret specifications or drawings for target audience (ISS, IM)
- 46.5.4 Record process (e.g., flowchart, step-by-step narrative) [ISS, IM]
- 46.5.5 Record data (ISS, IM)
- 46.5.6 Maintain test logs (PSD, ISS, IM)
- 46.5.7 Compile cumulative reference/record (ISS, IM)
- 46.5.8 Measure compliance with established parameters (ISS, IM)
- 46.5.9 Verify the accuracy and validity of the information (ISS, IM)
- 46.5.10 Select and organize information (ISS, IM)
- 46.5.11 Present content in clear and concise way (ISS, IM)
- 46.5.12 Employ presentation tools and techniques appropriate for the given documentation (ISS, IM)
- 46.5.13 Obtain feedback on the information provided and its technical accuracy (ISS, IM)
- 46.5.14 Test documentation for usability (ISS, IM)
- 46.5.15 Edit documentation for readability, grammar, and usage (ISS, IM)
- 46.5.16 Maintain required logs (ISS, IM)
- 46.5.17 Track expenses involved (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience. (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10)*
- *Evaluate the usefulness and credibility of data and sources, and synthesize information from multiple sources. (Research C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*
- *Give presentations using a variety of delivery methods, visual displays and technology. (Communication G, 8-10; Communication F, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Process D, 8-10)*
- *Apply tools to judge the quality of their writing. (Writing Process E, 8-10)*
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)*
- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12) Design and perform a statistical*

experiment, simulation or study, collect and interpret data, and use descriptive statistics to communicate and support predictions and conclusions. (Data C, 11-12)

- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 810)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)*

Unit 47: Professional Practices

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	P	R
IM		I	P

Competency 47.1: Identify legal and ethical behavior

TPO: Given several scenarios, identify legal and ethical behaviors by stating which behavior applies and why to 80% accuracy.

Descriptors:

- 47.1.1 Differentiate between legal and ethical behavior (ISS, IM)
- 47.1.2 Explain terms, principles, and characteristics of legal and ethical behavior (e.g., loyalty, discretion, solicitation, competitor, supplier) [ISS, IM]
- 47.1.3 Explain legal ramifications of breaching rules and regulations (ISS, IM)
- 47.1.4 Explain the effects and consequences of unethical and/or unlawful behavior (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD	I	P	R
IM	I	P	R

Competency 47.2 Explain professional responsibilities

TPO: Using current news events, explain professional responsibilities using a grid that displays the behavior, if the behavior is ethical or not and defend your answer.

Descriptors:

- 47.2.1 Explain the need for professional and ethical standards
- 47.2.2 Explain responsibility of the individual to apply ethical standards
- 47.2.3 Identify responsibility to clients(s) and employer(s)
- 47.2.4 Explain importance of conflict resolution in the workplace

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 47.3: Explain the role of the IT professional in maintaining customer satisfaction

TPO: Provided several scenarios, explain the role of the IT professional in maintaining customer satisfaction according to criteria discussed in class.

Descriptors:

- 47.3.1 Explain the nature of positive customer/client relations (ISS, IM)
- 47.3.2 Describe the importance of all customers to the business (PSD, ISS, IM)
- 47.3.3 Explain the importance of interaction with customers in a professional manner (ISS, IM)
- 47.3.4 Explain the importance of maintaining customer base (ISS, IM)
- 47.3.5 Determine appropriate communication vehicles (phone, e-mail, face-to-face) [PSD, ISS, IM]
- 47.3.6 Differentiate internal vs. external customer service (cost of existing versus new) [ISS, IM]
- 47.3.7 Discuss the role of company image (ISS, IM)
- 47.3.8 Discuss the role of customer feedback in customer satisfaction (ISS, IM)
- 47.3.9 Define function of call center (PSD, ISS, IM)
- 47.3.10 Identify customer expectations (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 47.4: Explain the importance of teams in achieving IT project goals

TPO: Given a group project, explain the importance of teams in achieving IT project goals using a project time-line working with a group versus working alone.

Descriptors:

- 47.4.1 Identify desired group and team behavior in an IT context (PSD, ISS, IM)
- 47.4.2 Explain the importance of cross-functional teams in the IT environment (ISS, IM)
- 47.4.3 Define roles/responsibilities within the group decision making process (PSD, ISS, IM)
- 47.4.4 Identify ways to assess team productivity and results (ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM	I	P	R

Competency 47.5: Explain the importance of professional behavior in the IT environment

TPO: After reviewing a company's employee policy, explain the importance of professional behavior in the IT environment correctly identifying at least six professional behaviors addressed in the company policy.

Descriptors:

- 47.5.1 Identify appropriate resources for company policies affecting professional behavior (e.g., organizational policies, personnel handbooks, and manuals) [PSD, ISS]
- 47.5.2 Discuss how specific organizational policies and rules influence a specific work situation (ISS)
- 47.5.3 Explain the importance of self-discipline, positive attitude and integrity in a work situation (e.g., attendance, personal appearance) [PSD, ISS]
- 47.5.4 Explain the importance of flexibility and willingness to learn new skills and knowledge (PSD, ISS)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	R	P
NS		P	R
PSD		I	P
IM	I	P	R

Competency 47.6: Explain the importance of health and safety standards and concepts in the IT workplace

TPO: Using the Internet, explain the importance of health and safety standards and concepts in the IT workplace with a two page report that discusses the importance of health and safety standards and concepts in the IT workplace. Embed a graph in your paper that shows the relationship between health, safety and productivity.

Descriptors:

- 47.6.1 Explain the relationship between health, safety and productivity (ISS)
- 47.6.2 Identify sources of safety information (e.g., company procedural manuals, documentation, standards, flowcharts) [ISS]
- 47.6.3 Explain the importance of maintaining a safe work area (ISS)

47.6.4 Explain how ergonomics and repetitive strain injury impact IT professionals (PSD, ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

Unit 48: Basic Business Concepts

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	R	P
IM		I	P

Competency 48.1: Explain business ownership

TPO: Given a business concept, explain the type of business ownership you should organize under and identify five pros and five cons to this type of organization.

Descriptors:

- 48.1.1 Define types of business ownership (e.g., sole proprietorship, partnership) [PSD, ISS, IM]
- 48.1.2 Explain the advantages and disadvantages of the different forms of business ownership (ISS, IM)
- 48.1.3 Identify variations in ownership forms (ISS, IM)
- 48.1.4 Explain how business organization ownership can evolve over time (ISS, IM)

Correlated English Language Arts Academic Content Benchmark

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 48.2: Explain basic business organization and structure

TPO: After reading assigned materials, explain basic business organization and structure and pass the related quiz to at least 80% accuracy.

Descriptors:

- 48.2.1 Differentiate between divisional and departmental structures (e.g., customer, geographic and product) [PSD, ISS, IM]
- 48.2.2 Identify types of organizational structures (e.g., organic, matrix, mechanistic) [PSD, ISS, IM]

48.2.3 Explain how internal and external forces impact the requirements for tech or service implementation (e.g., size, complexity, profitability) [PSD, ISS, IM]

Correlated Mathematics Academic Content Benchmarks

- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of mathematical model, interpretation of solution with the model, and validation to original problem situation. (Math. Process J, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.3: Discuss the role of IT in meeting business strategic objectives

TPO: Using an annual report, prepare a chart that summarizes the company goals and objectives, and stakeholders. Discuss how IT is used in the company (production, accounting, e-commerce).

Descriptors:

- 48.3.1 Identify common sources outlining strategic business objectives (NS, ISS, IM)
- 48.3.2 Define typical business objectives (PSD, ISS, IM)
- 48.3.3 Identify ways in which business objectives are measured (e.g., key performance indicators) [NS, ISS, IM]
- 48.3.4 Identify business stakeholders (e.g., shareholders, customers, suppliers) (NS, ISS, IM)
- 48.3.5 Discuss how IT functions impact business objectives (NS, ISS, IM)
- 48.3.6 Discuss obstacles in measuring the impact of IT functions on business objectives (NS, ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 48.4: Explain how IT functions interface with other business functions

TPO: After reading assigned materials explain how IT functions interface with other business functions and pass related quiz to at least 80% accuracy.

Descriptors:

- 48.4.1 Explain the role of IT in the business organization (PSD, ISS, IM)
 48.4.2 Explain how IT interfaces with the human resource function (ISS, IM)
 48.4.3 Explain how IT interfaces with the finance and accounting functions (ISS, IM)
 48.4.4 Explain how IT interfaces with the production/manufacturing functions (ISS, IM)
 48.4.5 Explain how IT interfaces with the sales, marketing, and distribution functions (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.5: Determine factors affecting business risk

TPO: Identify a business in your neighborhood and list at least ten factors that could affect the business future and profitability.

Descriptors:

- 48.5.1 Define business risk (PSD, NS, ISS, IM)
 48.5.2 Identify types of business risks (NS, ISS, IM)
 48.5.3 Describe ways to minimize business risks (NS, ISS, IM)
 48.5.4 Identify factors affecting a business' profit (NS, ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E. 810)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*

BIL: Recommended: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	R
PSD			I
IM		I	P

Competency 48.6: Explain basic accounting concepts

TPO: Given financial statements and corresponding worksheet, explain basic accounting concepts by completing the worksheet to 80% accuracy.

Descriptors:

- 48.6.1 Define accounting and explain the purpose of the accounting system
- 48.6.2 Explain basic accounting principles and applications
- 48.6.3 Identify appropriate accounting concepts and techniques for acquisition, depreciation, and disposal of property, plant, and equipment

Correlated English Language Arts Academic Content Benchmark

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases. (Number D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.7: Demonstrate knowledge of cost-benefit analysis

TPO: After reading the required text and a class discussion, demonstrate knowledge of cost-benefit analysis correctly matching 80% of the associated terms to their corresponding definitions on a worksheet.

Descriptors:

- 48.7.1 Define cost and benefit analyses (NS, PSD, IM, ISS)
- 48.7.2 Differentiate between nonrecurring costs and recurring costs (IM, ISS)
- 48.7.3 Identify major cost categories (e.g., hardware, software, communication services, training, interface conversion) [IM, ISS]
- 48.7.4 Differentiate between tangible benefits and intangible benefits (IM, ISS)
- 48.7.5 Explain why intangible benefits are included in analyses (IM, ISS)
- 48.7.6 Identify tools used to rank and compare alternative costs and benefits (e.g., Net Present Value, Return on Investment, Discounted Payback Period) [ISS]
- 48.7.7 Execute full cost-benefit analysis (ISS)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P

NS		I	P
PSD		I	P
IM		I	P

Competency 48.8: Explain the vendor management process

TPO: Provided several examples of RFP's explain the vendor management process according to criteria presented in class.

Descriptors:

- 48.8.1 Define components of a RFP (Request for Proposals) [e.g., transmittal letter, instructions and procedures, and requirements and specifications] (NS, ISS, IM)
- 48.8.2 Identify basic criteria for vendor selection (NS, PSD, ISS, IM)
- 48.8.3 Identify common forms of vendor-buyer agreements (NS, ISS, IM)
- 48.8.4 Identify common problems in the vendor management process in the IT environment (e.g., compliance, confidentiality and non-disclosure) [NS, ISS, IM]

Computer Networking Technology Curriculum Mapping

WEBXAM 82MB_	itWorks COURSE OF STUDY UNITS	Junior Year	Junior Year	Senior Year	Senior Year
		DISCOVERY 1 Networking for Home and Small Businesses Chapters	DISCOVERY 2 Working for a Small-to- Medium Business or ISP Chapters	DISCOVERY 3 Introducing Routing and Switching in the Enterprise Chapters	DISCOVERY 4 Designing and Supporting Computer Networks Chapters
01	Unit 1	1, 10	1		
01	Unit 2	2, 10			
09	Unit 4	9	2		
04	Unit 16	1, 8, 9, 10			
04	Unit 17	4			
05	Unit 18	3, 4, 5, 6, 9, 10	3, 4, 9	3, 4, 7	1, 5, 6
07	Unit 19	3, 4, 6	6, 7	1, 2	1, 4, 5
07	Unit 20	6, 8		9	
06	Unit 21	8	6	3, 5, 6, 7	1, 4, 5
09	Unit 22	10	3, 5, 7, 10	2, 7, 9, 10	2, 3, 5, 7, 8
05	Unit 23	8	8	4	

Computer Networking Technology Curriculum Mapping

WEBXAM 82MB_	itWorks COURSE OF STUDY UNITS	Junior Year	Junior Year	Senior Year	Senior Year
		DISCOVERY 1 Networking for Home and Small Businesses Chapters	DISCOVERY 2 Working for a Small-to- Medium Business or ISP Chapters	DISCOVERY 3 Introducing Routing and Switching in the Enterprise Chapters	DISCOVERY 4 Designing and Supporting Computer Networks Chapters
05	Unit 24	8	7, 8	3, 7, 8, 9	2, 5
07	Unit 25	7			
06	Unit 26	4			
08	Unit 27				2
08	Unit 30	9	9	9	
02	Unit 44	10	10	10	2, 10
02	Unit 45	10	10	10	9, 10
03	Unit 46	10	10	10	9, 10
02	Unit 47	10	10	10	10
02	Unit 48	10	10	10	10

CCNA Discovery Curriculum Outline

Chapter	Networking for Home and Small Businesses Junior Year	Working at a Small-to-Medium Business or ISP Junior Year	Introducing Routing and Switching in the Enterprise Senior Year	Designing and Supporting Computer Networks Senior Year
1	Personal Computer Hardware	The Internet and Its Uses	Networking in the Enterprise	Introducing Network Design Concepts
2	Operating Systems	Help Desk	Exploring the Enterprise Network Infrastructure	Gathering Network Requirements
3	Connecting to the Network	Planning a Network Upgrade	Switching in an Enterprise Network	Characterizing the Existing Network
4	Connecting to the Internet Through an ISP	Planning the Addressing Structure	Addressing in an Enterprise Network	Identifying Application Impacts on Network Design
5	Network Addressing	Configuring Network Devices	Routing with a Distance Vector Protocol	Creating the Network Design
6	Network Services	Routing	Routing with a Link-State Protocol	Using IP Addressing in the Network Design
7	Wireless Technologies	ISP Services	Implementing Enterprise WAN Links	Prototyping the Campus Network
8	Basic Security	ISP Responsibility	Filtering Traffic Using Access Control Lists	Prototyping the WAN
9	Troubleshooting Your Network	Troubleshooting	Troubleshooting an Enterprise Network	Preparing the Proposal
10	Course Summary: Putting It All Together	Course Summary: Putting It All Together	Course Summary: Putting It All Together	Course Summary: Putting It All Together

SCOPE & SEQUENCE

SENIOR YEAR PROGRAM

COMPUTER NETWORKING TECHNOLOGY
CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS
SCHOOL DISTRICT

Unit 18: Networking

Webxam 82MB.05

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	R
IM			

Competency 18.1: Demonstrate knowledge of basic network classifications and topologies

TPO: Provided a list of terms and a list of definitions demonstrate knowledge of basic network classifications and topologies with 80% accuracy.

Descriptors:

- 18.1.1 Interpret basic networking terminology (ISS)
- 18.1.2 Differentiate between LANs, CANs, WANs, MANs) [ISS]
- 18.1.3 Describe how to turn LANs into CANs and WANs, MANs) [ISS]
- 18.1.4 Identify the basic point-to-point network topologies (e.g., star, ring, tree, network, irregular) [ISS]
- 18.1.5 Explain packet-switching techniques (ISS)
- 18.1.6 Identify the basic broadcast topologies (e.g., star ring, bus) [ISS]
- 18.1.7 Compare the characteristics of connection-oriented and connectionless protocols (ISS)
- 18.1.8 Identify standard high-speed networks (e.g., broadband, ISDN, SMDS, ATM, FDDI, DS3, SONET, Optical Carrier Systems) [ISS]
- 18.1.9 Identify emerging networks (e.g., ATM; ISDN; satellite nets; optic nets; integrated voice, data, and video) [ISS]
- 18.1.10 Explain network storage techniques (e.g., fiber channel, SCSI, IP, ISCSI) [ISS]

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 18.2: Demonstrate knowledge of local-area network trends and issues

TPO: Provided access to the text and the internet demonstrate knowledge of local-area network trends and issues with no more than two errors.

Descriptors:

- 18.2.1 Describe the reasons for installing a network (ISS)
- 18.2.2 Trace the evolution of networks (ISS)
- 18.2.3 Analyze current trends and developments in LANs and WANs and wireless networks (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 18.3: Demonstrate knowledge of network physical layer

TPO: Provided access to the text and instructor presentation demonstrate knowledge of network physical layer with 80% accuracy.

Descriptors:

- 18.3.1 Differentiate between baseband and broadband transmission (ISS)
- 18.3.2 Identify the criteria used in making cable selection decisions (e.g., physical properties, transmission technologies, transmission span, bandwidth, topology, security, noise immunity, installation considerations, cost)
- 18.3.3 Differentiate between cable types (e.g., coaxial, twisted-pair, optical fibers) and interfaces (ISS)
- 18.3.4 Compare/contrast a cable types (e.g., CAT5, CAT5E, CAT6+) [ISS]
- 18.3.5 Describe types of cable connectors and grounding techniques (ISS)
- 18.3.6 Describe typical cable applications (ISS)
- 18.3.7 Identify cable standards (e.g., ANSI, EIA/TIA-568, EIA/TIA-569) [ISS]
- 18.3.8 Identify the advantages and disadvantages of cabling systems (ISS)
- 18.3.9 Describe typical problems associated with cable installation (ISS)
- 18.3.10 Demonstrate cable testing and tolerance levels
- 18.3.11 Discuss the fundamentals of RF

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM			

Competency 18.4: Demonstrate knowledge of network connectivity basics

TPO: After review of the text demonstrate knowledge of network connectivity basics without the use of notes.

Descriptors:

- 18.4.1 Identify and describe the characteristics and functions of point-to-point channels, switched, and meshed network
- 18.4.2 Define the characteristics and functions of broadcast channels
- 18.4.3 Explain types of interoperability
- 18.4.4 Describe Internet, Intranet, and Extranet usage and connectivity

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots and affixes to determine the meanings of complex words and subject area vocabulary. (Vocabulary E, 8-10)*
- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*
- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary(Vocabulary D, 11-12)*

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 18.5: Demonstrate knowledge of protocol concepts

TPO: Without the aid of references, demonstrate knowledge of protocol concepts according to criteria outlined in the text.

Descriptors:

- 18.5.1 Identify the advantages and disadvantages of standard protocols (ISS)
- 18.5.2 Explain the purposes of, and procedures for, encapsulation and decapsulation
- 18.5.3 Explain network protocols (e.g., IP Suite, IPX/SPX, IPSEC) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary(Vocabulary D, 11-12)

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		P	R
PSD			
IM			

Competency 18.6: Demonstrate knowledge of the Open Systems Interconnection (OSI) standard (ISO Standard 7498)

TPO: Given a layer of the OSI model, demonstrate knowledge of the Open Systems Interconnection (OSI) standard (ISO Standard 7498) according to class handout.

Descriptors:

- 18.6.1 Identify the benefits of using a layered network model
- 18.6.2 Identify the seven layers at which decisions must be made according to the OSI standard
- 18.6.3 Compare OSI stack positions and their relationship to one another
- 18.6.4 Describe actions to be performed at each of the OSI physical layers

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		P	R
PSD			
IM			

Competency 18.7: Demonstrate knowledge of communication standards for networks

TPO: Using examples provided demonstrate knowledge of communication standards for networks based with 80% accuracy.

Descriptors:

- 18.7.1 Explain digital data communication techniques and standards, including asynchronous and synchronous transmission, error detection and correction codes, and physical interfaces
- 18.7.2 Describe data-transmission basics (e.g., SYN, Syn-ack)

BIL: Essential: NS
Recommended: ISS, PSD

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD		I	R
IM			

Competency 18.8: Demonstrate knowledge of data encoding basics

TPO: Following directions provided in class demonstrate knowledge of data encoding basics with no more than two errors.

Descriptors:

- 18.8.1 Apply and convert amongst the four numbering systems: binary, octal, hexadecimal, and decimal (NS)
- 18.8.2 Demonstrate ASCII representation of characters (NS)
- 18.8.3 Demonstrate EBCDIC representation of characters (NS)
- 18.8.4 Convert ASCII characters to EBCDIC Unicode equivalents and vice versa (NS)

Correlated Mathematics Academic Content Benchmarks

- *Compare, order and determine equivalent forms of real numbers. (Number E, 8-10)*

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 18.9: Demonstrate knowledge of IP addressing schemes

TPO: Provided an IP address and subnet mask demonstrate knowledge of IP addressing schemes with 80% accuracy.

Descriptors:

- 18.9.1 Explain how names and addresses are determined for LANs (ISS)
- 18.9.2 Identify components of a network address in dotted decimal form (e.g., Class A, B, C) [ISS]
- 18.9.3 Identify the class of network to which a given address belongs (ISS)
- 18.9.4 Differentiate between default subnet masks and custom subnet masks (ISS)
- 18.9.5 Explain the relationship between an IP address and its associated subnet mask (ISS)
- 18.9.6 Create custom subnet masks to meet network design requirements (ISS)
- 18.9.7 Identify difference between classed and classless addressing schemes (ISS)

Correlated Mathematics Academic Content Benchmarks

- *Use a variety of mathematical representations flexibly and appropriately to organize, record and communicate mathematical ideas. (Math. Process E, 8-10)*

Unit 19: Network Architectures

Webxam 82MB.07

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 19.1: Demonstrate knowledge of the basics of network architecture

TPO: Upon completing classroom discussions and required reading, demonstrate knowledge of the basics of network architecture based upon the criteria specified in the assessment instrument.

Descriptors:

- 19.1.1 Describe the characteristics and uses of network components (e.g., hub, switches, routers, firewall) [ISS]
- 19.1.2 Identify LAN transmission methods (e.g., bus, pure ring, star ring topologies) [ISS]
- 19.1.3 Describe broadband and baseband transmission methods and standards (ISS)
- 19.1.4 Identify LAN transmission media (e.g., twisted pair, fiber-optic cable, wireless) [ISS]
- 19.1.5 Evaluate LAN medium-access protocols (e.g., CSMA/CD, token bus, token ring, FDDI)
- 19.1.6 Identify the components of, and relationships within, the OSI 8802 (IEEE 802) protocol suite
- 19.1.7 Identify LAN performance factors (signal attenuation, signal propagation delay)
- 19.1.8 Explain reasoning for OSI modeling (ISS)
- 19.1.9 Differentiate between a physical and logical topology (e.g., VLAN) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- *Distinguish the relationship of word meanings between pairs of words encountered in analogical statements. (Vocabulary B, 11-12)*
- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Solve increasingly complex non-routine measurement problems and check for reasonableness of results. (Measurement A, 8-10)*
- *Prove or disprove conjectures and solve problems involving two- and three-dimensional objects represented within a coordinate system. (Geometry G, 8-10)*
- *Solve problem situations involving derived measurements; e.g., density, acceleration.*

(Measurement D, 11-12)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 19.2: Demonstrate knowledge of the basics of Ethernet technology

TPO: Given a list of network performance objectives and completing required reading, demonstrate knowledge of the basics of Ethernet technology with 80% correct responses on an assessment instrument.

Descriptors:

- 19.2.1 Describe differences in Ethernet topologies (ISS)
- 19.2.2 Select appropriate use of basic Ethernet configurations (e.g., simple, hub, hubs and bridges, server, switch) [ISS]
- 19.2.3 Evaluate the advantages and disadvantages of Ethernet networks as they relate to other networks (ISS)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			I
IM			

Competency 19.3: Demonstrate knowledge of the TCP/IP protocol suite details

TPO: Provided with two lists, one of terms and another of definitions, demonstrate knowledge of the TCP/IP protocol suite details by matching with 80% accuracy.

Descriptors:

- 19.3.1 Compare the basics of TCP/IP layers, components, and functions (ISS)
- 19.3.2 Identify how the TCP layers relate to the OSI model (ISS)
- 19.3.3 Compare and contrast TCP and IP delivery service (ISS)
- 19.3.4 Identify TCP/IP applications and services (e.g., rlogin, SMTP, telnet, FTP, DNS, NFS, VoIPs)
- 19.3.5 Explain TCP/IP protocol details (e.g., Internet addresses, ARP, RARP, IP datagram format, routing IP datagrams, TCP segment format)
- 19.3.6 Identify how the protocol suite can be used to provide prioritization and differentiation between multiple media types (e.g., QoS)

Unit 20: Network Operating Systems

Webxam 82MB.07

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			

Competency 20.1: Demonstrate knowledge of the network operating systems characteristics

TPO: Upon completion of corresponding text and activities, demonstrate knowledge of the network operating systems characteristics with 80% accuracy.

Descriptors:

- 20.1.1 Identify the purposes of a network operating system (NOS) [ISS]
- 20.1.2 Identify how the components of a network operating system (i.e., server platform, network services software, network redirection software, communications software) support network operations (ISS)
- 20.1.3 Define the criteria used to evaluate network operating systems (ISS)
- 20.1.4 Identify how protocols are supported
- 20.1.5 Identify licensing requirements
- 20.1.6 Describe the characteristics of the a tiered model (e.g., peer-to-peer, thin client)
- 20.1.7 Analyze the advantages and disadvantages of the client/server model (ISS)
- 20.1.8 Compare and contrast various network operating systems (e.g., Novell NetWare, Windows, Linux, UNIX) [ISS]

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 20.2: Install and administer network operating system and services

TPO: Provided access to a simulated network environment, install and administer network operating system and services according to procedures outlined in class.

Descriptors:

- 20.2.1 Create domain trusts (NS)
- 20.2.2 Maintain domain controllers (NS)
- 20.2.3 Make policy changes (NS)
- 20.2.4 Employ policy templates (NS)
- 20.2.5 Create user accounts, groups, and login scripts (NS)
- 20.2.6 Control access to files and directories (NS, ISS)
- 20.2.7 Establish shared network resources (NS, ISS)
- 20.2.8 Configure network domain accounts and profiles (NS)
- 20.2.9 Implement system policies (NS)
- 20.2.10 Create roaming user profiles (NS)
- 20.2.11 Troubleshoot network performance (NS)

Unit 21: Wide-Area Networks

Webxam 82MB.06

BIL: Essential: ISS, NS
Recommended: IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD			
IM		I	P

Competency 21.1: Demonstrate knowledge of basic telecommunications and the interconnection of networks

TPO: Upon completing the required reading demonstrate knowledge of basic telecommunications and the interconnection of networks with 80% accuracy.

Descriptors:

- 21.1.1 Describe the different types of WAN connections
- 21.1.2 Describe point-to-point (PPP) interconnection
- 21.1.3 Identify basic telecommunications services (e.g., satellite, circuit switching, packet switching, wireless)
- 21.1.4 Identify communications carriers and their services
- 21.1.5 Identify the role of telecommunications tariffs

BIL: Essential: ISS, NS
Recommended: IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD			
IM			P

Competency 21.2: Assess user needs for a wide-area network (WAN)

TPO: Given a scenario provided by the teacher, assess user needs for a wide-area network (WAN) based on criteria specified in a rubric.

Descriptors:

- 21.2.1 Determine availability from LAN to meet requirements of WAN
- 21.2.2 Determine the speed needed between sites to access applications
- 21.2.3 Determine the subnets needed on the WAN including VLSM
- 21.2.4 Evaluate transmission options

Correlated Mathematics Academic Content Benchmarks

- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this information, and set limits for acceptable solution. (Math. Process A, 8-10)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 21.3: Design WAN systems

TPO: After review of the text, describe the design of WAN systems as according to class handout with no more than two errors.

Descriptors:

- 21.3.1 Describe the basics of telephony (analog vs. digital signals) [NS, ISS]
- 21.3.2 Describe the conversion of analog speech to digital (NS, ISS)
- 21.3.3 Relate voice, data concepts, and video to wide-area networks (NS)
- 21.3.4 Select primary and backup data circuits (NS)
- 21.3.5 Evaluate analog and digital transmission for cost, performance, and reliability (NS)
- 21.3.6 Integrate firewalls to separate trusted network and WAN (NS)
- 21.3.7 Establish a Virtual Private Network (VPN) to form the infrastructure of the WAN (NS)
- 21.3.8 Determine routers needed to connect with LAN (NS)
- 21.3.9 Interconnect LANs using WAN services (NS)
- 21.3.10 Demonstrate cost-savings approaches (e.g., voice/video/data compression)
- 21.3.11 Discuss complexities of routing and multiple services over a WAN (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings (Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 11-12)*

Unit 22: Network Management

Webxam 82MB.09

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 22.1: Demonstrate knowledge of network management activities and procedures

TPO: After completing the required reading, demonstrate knowledge of network management activities and procedures with 80% correct response.

Descriptors:

- 22.1.1 Evaluate the basic principles of network management (NS, ISS)
- 22.1.2 Identify network system bootstrapping/initial program load (NS)
- 22.1.3 Identify server configuration and role (e.g., file server, print server or other network services (e.g., DNS, DHCP) [NS]
- 22.1.4 Determine file organization (e.g., by owners, users, and privileges) [NS]
- 22.1.5 Establish common standards for setting up and naming for the network, files, accounts, services (NS)
- 22.1.6 Determine methods for increasing performance (e.g., segmenting and balancing the network load, resolving channel and cable bottlenecks) [NS]
- 22.1.7 Define the role of the network manager (NS, ISS)
- 22.1.8 Determine procedures for performance analysis, evaluation, and monitoring (NS)
- 22.1.9 Determine procedures for network system optimization and tuning (NS)
- 22.1.10 Determine procedures for managing network assets (e.g., users, groups, printers) [NS]

Correlated English Language Arts Academic Content Benchmarks

- Compile, organize and evaluate information, take notes and summarize findings (Research B, 11-12)
- Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Model and solve problem situations involving direct and inverse variation. (Algebra I, 810)*
- *Formulate a problem or mathematical model in response to a specific need or situation, determine information required to solve the problem, choose method for obtaining this*

information, and set limits for acceptable solution. (Math. Process A, 8-10)

- Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)
- Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretation of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)
- Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)

BIL: Essential: ISS, NS
Recommended: PSD

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			I
IM			

Competency 22.2: Demonstrate knowledge of network applications

TPO: After completing research, demonstrate knowledge of network applications with 80% correct response.

Descriptors:

- 22.2.1 Describe how disk storage is shared across a network (NS, ISS)
- 22.2.2 Describe the differences among application-specific servers (e.g., database, print, communications, terminal, fax, security) [NS]
- 22.2.3 Identify the advantages of sharing backup and management of PCs across a network (NS, ISS)
- 22.2.4 Identify and manage software licensing requirements and categories (NS, ISS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS			P
NS		I	P
PSD			
IM			

Competency 22.3: Solve network applications problems

TPO: Using a classroom network, solve network applications problems with an improvement in network performance.

Descriptors:

- 22.3.1 Identify potential hardware compatibility problems (NS)
- 22.3.2 Identify precautions included in programs used on networks (e.g., self-metering, security keys, required configuration settings) [NS]

- 22.3.3 Identify network areas in which application problems could exist (e.g., memory allocation, file lock settings, resource availability) [NS]
- 22.3.4 Troubleshoot network software problems (NS)
- 22.3.5 Perform network analysis using monitoring tools

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.4: Perform network analysis, selection, and design

TPO: Using a case study provided by the teacher, perform network analysis, selection, and design meeting standards set by assessment instrument (rubric/checklist).

Descriptors:

- 22.4.1 Gather data to identify customer requirements (NS)
- 22.4.2 Identify system and network requirements (NS)
- 22.4.3 Analyze requirements (NS)
- 22.4.4 Define scope of work to meet customer requirements (NS)
- 22.4.5 Develop functional requirements/specifications for high-level systems (NS)
- 22.4.6 Identify time, technology, and resource constraints (NS)
- 22.4.7 Identify physical requirements for system implementation (NS)
- 22.4.8 Analyze system interdependencies (NS)
- 22.4.9 Identify alternate solutions
- 22.4.10 Research product and vendor architecture and equipment specifications/limitations (NS)
- 22.4.11 Estimate impact of change request (NS)
- 22.4.12 Prepare cost/benefit/risk analysis
- 22.4.13 Perform human factors analysis
- 22.4.14 Participate in design reviews
- 22.4.15 Design prototype of system
- 22.4.16 Develop testing strategy
- 22.4.17 Prepare overall plan for integrating new processes, protocols, and equipment (NS)
- 22.4.18 Develop deployment strategies appropriate for situation
- 22.4.19 Analyze facilities' bandwidth requirements and capacity planning (power cable/wire conduit)
- 22.4.20 Revise processes/structure based on testing and certification (NS)
- 22.4.21 Identify hardware/software selection criteria (NS)
- 22.4.22 Select a LAN/WAN technology that meets defined set of requirements (NS)

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.(Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonable of solutions. (Measurement F, 8-10)*
- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validations to original problem situation. (Math. Process J, 11-12)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.5: Perform network installation procedures

TPO: In a classroom network, perform network installation procedures with no more than two errors.

Descriptors:

- 22.5.1 Access needed information using company and manufacturers' references (e.g.proceduralmanuals, documentation, standards, work flowcharts) [NS]
- 22.5.2 Assess user needs to determine which network operating systems to use (NS)
- 22.5.3 Set up/configure workstation-network connections (NS)
- 22.5.4 Set up/configure network components (e.g., routers, switches) [NS]
- 22.5.5 Install LAN (NS)
- 22.5.6 Configure file server in PC network (NS)
- 22.5.7 Construct network cables (NS)
- 22.5.8 Test network connectivity using a network analyzer

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.(Research B, 11-12)*
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)*

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 22.6: Perform network operation procedures

TPO: In a classroom network, perform network operation procedures with no more than two errors.

Descriptors:

- 22.6.1 Determine the type of wiring needed for the physical connection of the network (NS, ISS)
- 22.6.2 Connect PCs to form a network (NS, ISS)
- 22.6.3 Link mixed vendors (e.g., PC to Mac)
- 22.6.4 Document LAN configuration (NS, ISS)
- 22.6.5 Identify how the network protocols work together (NS)
- 22.6.6 Determine compatibility of various networks (NS)
- 22.6.7 Set up/configure TCP/IP services on workstations and network servers (NS)
- 22.6.8 Implement print queue in a network (NS)
- 22.6.9 Perform file-to-file copy in a network (NS, ISS)
- 22.6.10 Install/configure file server in a network

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 22.7: Perform hardware and desktop support

TPO: In a classroom network, perform hardware and desktop support, according to the criteria outlined in the classroom procedure checklist.

Descriptors:

- 22.7.1 Install and use network printers (NS, ISS)
- 22.7.2 Check physical and virtual connections (NS, ISS)
- 22.7.3 Map network devices (NS)
- 22.7.4 Replace basic computer hardware (NS, ISS)

- 22.7.5 Set up system configuration (NS)
- 22.7.6 Start up/shut down network system (NS)
- 22.7.7 Install software packages (NS)
- 22.7.8 Respond to system messages (NS)
- 22.7.9 Troubleshoot system (NS)
- 22.7.10 Perform system analysis (NS)
- 22.7.11 Perform preventive maintenance (NS)
- 22.7.12 Perform software license audits
- 22.7.13 Coordinate security procedures

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.8: Perform network administration

TPO: In a classroom network, perform network administration according to the criteria outlined in the network procedure checklist.

Descriptors:

- 22.8.1 Define the role of the LAN administrator (NS)
- 22.8.2 Implement system security policies
- 22.8.3 Install network management software (NS)
- 22.8.4 Perform administration functions using LAN manager software
- 22.8.5 Perform bandwidth optimization
- 22.8.6 Respond to system messages (NS)
- 22.8.7 Troubleshoot system (NS)
- 22.8.8 Install and monitor server software applications
- 22.8.9 Perform system analysis (NS)
- 22.8.10 Perform preventive maintenance (NS)
- 22.8.11 Perform resource management (e.g., apply standards, address protocols, monitor network activity, perform trend analyses, functional verifications, audits and monitoring)
- 22.8.12 Coordinate security procedures
- 22.8.13 Document actions taken (e.g., backups, virus prevention, and software distribution) [NS]
- 22.8.14 Execute network diagnostics program for software and hardware (NS)
- 22.8.15 Apply standard policies
- 22.8.16 Establish a preventive maintenance schedule (NS)
- 22.8.17 Document and diagram network topology (NS)
- 22.8.18 Describe authentication process to network devices and for users (NS)

Correlated Mathematics Academic Content Benchmarks

- Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
- Solve increasingly complex non-routine measurement problems and check for reasonableness of results. (Measurement A, 8-10)

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.9: Perform network maintenance and diagnostics and testing

TPO: In a classroom network, perform network maintenance and diagnostics and testing according to specified procedures that improve network performance.

Descriptors:

- 22.9.1 Perform preventive maintenance (NS)
- 22.9.2 Respond to system messages (NS)
- 22.9.3 Troubleshoot system (NS)
- 22.9.4 Restore LAN operating systems (NS)
- 22.9.5 Replace LAN hardware components (NS)
- 22.9.6 Define the scope and applicability of the test (NS)
- 22.9.7 Develop a test plan (NS)
- 22.9.8 Identify needed resources (NS)
- 22.9.9 Obtain needed resources (NS)
- 22.9.10 Assess network impact (NS)
- 22.9.11 Set up test environment (NS)
- 22.9.12 Set up testing schedule (NS)
- 22.9.13 Execute testing in accordance with established plans and schedule (NS)
- 22.9.14 Document errors reported/tracked (NS)
- 22.9.15 Interpret test results (NS)
- 22.9.16 Develop central log strategy for network devices

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 22.10: Recommend disaster recovery and business continuity plans

TPO: Using a case study provided by the teacher, recommend disaster recovery and business continuity plans so no data is lost.

Descriptors:

- 22.10.1 Differentiate between disaster recovery and business continuity
- 22.10.2 Identify common backup devices (NS)
- 22.10.3 Identify the criteria for selecting a backup system (e.g., tape) [NS]
- 22.10.4 Establish process for archiving files (NS)
- 22.10.5 Develop and test a disaster recovery plan
- 22.10.6 Develop a business resumption plan

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

Unit 23: Security Fundamentals

Webxam 82MB.05

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		P	R

Competency 23.1: Examine the history and components of information assurance

TPO: After completing the required reading, examine the history and components of information assurance based upon the criteria specified in the assessment instrument.

Descriptors:

- 23.1.1 Identify significant advances in the development of computer security and the trend towards information assurance (NS)
- 23.1.2 Describe the evolution of major threats to computers including physical security, viruses, worms, spyware, malware, and hacker attempts and the influence this has had on the current state of information assurance (NS, ISS, PSD)
- 23.1.3 Discuss the role of the government in evolving standards and security initiatives (e.g., encryption, cryptography) [NS]
- 23.1.4 Describe the role of networking and the increased need for security and information assurance (NS, ISS)
- 23.1.5 Discuss how legislative and ethical issues and standards have impacted network security (e.g., HIPPA, GLBA, SOX) [NS, ISS]
- 23.1.6 Discuss the need for confidentiality, integrity, and availability of information (CIA) [NS, ISS, PSD]
- 23.1.7 Discuss the need for authentication and non-repudiation of information (e.g., PKI) [NS]
- 23.1.8 Illustrate security risks and associated safeguards (NS)
- 23.1.9 Examine the role of government-industry-academia partnerships in increasing the information assurance levels domestically and globally (NS)
- 23.1.10 Discuss careers and certification programs associated with security (NS, ISS, PSD)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

**BIL: Essential: ISS, NS
Recommended: PSD**

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	R
IM			

Competency 23.2: Describe the components associated with computer and network security systems

TPO: Provided access to all references and materials on the Internet and text, describe the components associated with computer and network security systems according to class handout in Network security.

Descriptors:

- 23.2.1 Identify and discuss biometric systems (e.g., fingerprinting, retina scans, voice analysis) [NS]
- 23.2.2 Describe two-factor authentication techniques (e.g., smart cards) [NS, ISS]
- 23.2.3 Explain the role of digital signatures in achieving information assurance and integrity (NS)
- 23.2.4 Explain the role of digital certifications in achieving information assurance (NS)
- 23.2.5 Explain the role of hashing algorithms (e.g., MD5, SHA1) in achieving information assurance and integrity (NS)
- 23.2.6 Discuss the need for policy addressing confidentiality (NS, ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 11-12)*

Unit 24: Secure Network Management

Webxam 82MB.05

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS		I	P
PSD			
IM			

Competency 24.1: Implement secure network management activities and procedures

TPO: Upon completing classroom discussions and required reading, implement secure network management activities and procedures with instructor guidance.

Descriptors:

- 24.1.1 Identify need for data protection (NS)
- 24.1.2 Identify need for network security ((NS)
- 24.1.3 Analyze network security issues (NS)
- 24.1.4 Identify security requirements (NS)
- 24.1.5 Analyze the advantages/disadvantages of firewall architectures
- 24.1.6 Select the appropriate security appliance (e.g., combined firewall routers, proxy server software solutions, dedicated software solutions, dedicated appliances)
- 24.1.7 Identify specific access levels that need to be accommodated
- 24.1.8 Determine how to protect against spoofing
- 24.1.9 Devise account administration functions to support network security (e.g., managing access control lists [ACL] of network resources)
- 24.1.10 Develop and establish best practices in security plans
- 24.1.11 Match security system design to identified security requirements
- 24.1.12 Analyze and discuss security issues and how they are mitigated with the use of software distribution management systems (e.g., patch management)

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential: NS
Recommended: ISS, PSD

EDU:	10	12	AD
ISS		I	R
NS			P

PSD			I
IM			

Competency 24.2: Describe risk analysis

Descriptors:

- 24.2.1 Discuss the balance between risk, cost, security, and implementation
- 24.2.2 Discuss a variety of security architectures and their application as they pertain to business networks
- 24.2.3 Describe risks based on vulnerability level, likelihood level, and impact level to the organization

Correlated Mathematics Academic Content Benchmarks

- *Compute probabilities of compound events, independent events, and simple dependent events. (Data J, 8-10)*
- *Make predictions based on theoretical probabilities and experimental results. (Data K, 8-10)*

BIL: Essential: NS
Recommended: ISS

EDU:	10	12	AD
ISS		I	R
NS			P
PSD			
IM			

Competency 24.3: Explain information technology mechanisms as they apply to a multilayer defense structure

Descriptors:

- 24.3.1 Discuss currently available intrusion prevention, detection, and mitigation systems
- 24.3.2 Illustrate auditing and log file management (e.g., archiving, clearing, sizing)
- 24.3.3 Discuss incident handling procedures, including involvement of CERT and law enforcement
- 24.3.4 Identify security risks and breaches by reviewing system logs
- 24.3.5 Discuss concepts and principles in packet inspection and filtering (e.g., firewall and routers)
- 24.3.6 Discuss concepts as they pertain to black hole lists, spam services, open relay and other types of attacks
- 24.3.7 Compare and contrast network analysis tools that identify security risks and vulnerabilities
- 24.3.8 Discuss theory of secure network management with VLANs and out-of-band networks
- 24.3.9 Discuss information asset identification and classification and disposal
- 24.3.10 Discuss concepts as they relate to human security (e.g., social engineering)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD			
IM			

Competency 24.4 Explain communication in a WAN environment

TPO: Provided with two lists, one of terms and another of definitions, explain communication in a WAN environment by matching with 80% accuracy.

Descriptors:

- 24.4.1 Differentiate the use of tunneling protocols both hardware and software in securing communication (e.g., L2TP, PPTP) [NS]
- 24.4.2 Describe methods for encrypting communication (e.g., IPSEC) [NS]
- 24.4.3 Describe VPNs using tunneling protocols and encrypting techniques (NS, ISS)
- 24.4.4 Explain the use of enterprise authentication management in securing communications (NS)
- 24.4.5 Discuss the role of certificate authorities (NS)

Unit 27: Information Systems (IS) Theory

Webxam 82MB.08

BIL: Essential: ISS, NS, PS

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD	I	R	P
IM			

Competency 27.1: Explain systems theory

TPO: Provided a list of terms and a list of examples, explain systems theory correctly matching the terms with 80% accuracy.

Descriptors:

- 27.1.1 Explain the underlying concepts of the information systems discipline (ISS, NS)
- 27.1.2 Compare/contrast data, information, and knowledge (ISS, NS)
- 27.1.3 Compare methods for achieving productivity in knowledge work (NS)
- 27.1.4 Apply general systems theory to the analysis and development of an information system (NS)
- 27.1.5 Identify the properties of open and proprietary systems (PSD, NS)
- 27.1.6 Define the relationship between system components (NS)
- 27.1.7 Characterize the role of data representation, both non-numeric and numeric (e.g., integers, reals, errors) [ISS, PSD, NS]
- 27.1.8 Identify procedures for formal problem solving (PSD, NS)
- 27.1.9 Differentiate between the role of information systems within a company and their role in a global environment (ISS, NS)

Correlated Mathematics Academic Content Benchmarks

- *Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers. (Number D, 8-10)*
- *Analyze and compare functions and their graphs using attributes, such as rates of change, intercepts and zeros. (Algebra E, 8-10)*
- *Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations. (Math. Process H, 11-12)*

Unit 30: System Installation and Maintenance

Webxam 82MB.08

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS			P
NS		I	P
PSD			
IM			

Competency 30.6: Explain backup and recovery, both on and offsite

TPO: After completing the required reading and class discussion, explain backup and recovery, both on and offsite with 80% correct response.

Descriptors:

- 30.6.1 Compile backup and recovery plan to be used by technical support group and users (NS)
- 30.6.2 Discuss backup procedures in accordance with a regular schedule (NS)
- 30.6.3 Discuss recovery procedures as needed (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.7: Troubleshoot problems

TPO: While in the classroom, troubleshoot problems according to classroom procedures.

Descriptors:

- 30.7.1 Demonstrate basic troubleshooting procedures (NS)
- 30.7.2 Diagnose computer problems (NS)
- 30.7.3 Develop resolution plan (NS)
- 30.7.4 Test identified solutions (NS)
- 30.7.5 Implement selected solution (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.8: Evaluate problem-solving processes and results

TPO: Upon completion of a networking system problem, evaluate problem-solving processes and results meeting standards set by the teacher.

Descriptors:

- 30.8.1 Evaluate problem-solving outcomes to determine whether the problem was solved as intended (NS)
- 30.8.2 Evaluate whether the process was applied in an efficient and responsible manner (NS)
- 30.8.3 Determine needed follow-up actions (NS)

BIL: Essential: ISS, NS

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD			
IM			

Competency 30.9: Integrate software upgrades and fixes

TPO: Using guidelines governing software acquisition and upgrades, integrate software upgrades and fixes according to procedures.

Descriptors:

- 30.9.1 Identify principles governing software acquisition and upgrades (NS)
- 30.9.2 Analyze operational problems (NS)
- 30.9.3 Install software upgrades or patches as needed (NS)

Unit 44: Business Processes for IT Professionals

Webxam 82MB.02

This unit details the methodology for the development, implementation, and monitoring of an IT-related work product or system. It is strongly recommended that the process oriented competencies in this unit be taught in conjunction with (not separate from) the technical, workplace, and academic skills outlined in other units.

Initiation/Planning Phase- Project Planning

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	P	R
NS		P	R
PSD	I	P	R
IM		P	R

Competency 44.1: Demonstrate knowledge of project planning methodology

TPO: Given a scenario, prepare a detailed project proposal to demonstrate knowledge of project planning methodology which meets guidelines set forth by instructor.

Descriptors:

- 44.1.1 Define terms associated with project planning
- 44.1.2 Identify steps associated with project planning
- 44.1.3 Identify methodologies associated with project planning
- 44.1.4 Define the project's contribution to business needs
- 44.1.5 Identify stakeholders and decision makers
- 44.1.6 Define the scope of the project
- 44.1.7 Evaluate project requirements
- 44.1.8 Develop task list (e.g., work breakdown structures)
- 44.1.9 Prioritize tasks according to business needs
- 44.1.10 Identify required resources and budget
- 44.1.11 Develop initial project management flowchart
- 44.1.12 Identify critical milestones
- 44.1.13 Evaluate risks
- 44.1.14 Prepare contingency plan
- 44.1.15 Develop a method of evaluation
- 44.1.16 Explain alternative development methodologies

Correlated English Language Arts Academic Content Benchmark

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*
- *Generalize and explain patterns and sequences in order to find the next term and the nth term. (Algebra A, 8-10)*

Requirements Analysis Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.2: Conduct requirements analysis

TPO: Provided a business scenario, conduct a requirements analysis using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.2.1 Identify business needs/expectations (PSD, NS, IM, ISS)
- 44.2.2 Analyze use of product or system (PSD, NS, IM, ISS)
- 44.2.3 Specify functional requirements (NS, IM, ISS)
- 44.2.4 Specify data requirements (NS, IM, ISS)
- 44.2.5 Describe how processes and data support business expectations (PSD, NS, IM, ISS)
- 44.2.6 Develop test criteria and plans (NS, IM, ISS)
- 44.2.7 Revise documentation prepared in initiation/planning phase as needed (NS, IM, ISS)
- 44.2.8 Generate task status report (NS, IM, ISS)
- 44.2.9 Track critical milestones (NS, IM, ISS)
- 44.2.10 Participate in project phase review (NS, IM, ISS)
- 44.2.11 Report project status (NS, IM, ISS)

Correlated English Language Arts Academic Content Benchmarks

- Use revision strategies to improve the style, variety of sentence structure, clarity of controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas. (Writing Process C, 8-10)
- Use a variety of strategies to revise content, organization and style, and to improve word choice, sentence variety, clarity and consistency of writing. (Writing Process C, 8-10; Writing Process C, 11-12)
- Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)
- Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)
- Construct convincing arguments based on analysis of data and interpretation of graphs (Data F, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
- Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data B, 11-12)
- Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)
- Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)
- Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.3: Demonstrate knowledge of the requirements analysis phase

TPO: Provided a business scenario demonstrate knowledge of the requirements analysis phase using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.3.1 Identify business expectations (PSD, ISS, NS, IM)
- 44.3.2 Explain how implementation will impact the environment (NS, IM)
- 44.3.3 Explain budget and time restraints (ISS, NS, IM)
- 44.3.4 Explain how the business environment impacts requirements (e.g., risks and rewards)

[NS, IM]

44.3.5 Explain how internal and external forces impact project requirements (ISS, NS, IM)

44.3.6 Explain how legal and regulatory issues impact project requirements (NS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). [Reading Process B, 11-12]*

Design/Development Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.4: Identify current technical environment

TPO: Examine your computer to identify your current technical environment and list ten internal and ten external components.

Descriptors:

44.4.1 Identify current internal and external technical resources (NS, ISS, IM)

44.4.2 Identify current internal and external technology (PSD, NS, ISS, IM)

44.4.3 Identify internal and external processes (NS, ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.5: Demonstrate knowledge of design alternatives and options

TPO: Given a written situation involving equipment purchase, demonstrate knowledge of design alternatives and options as part of a case study.

Descriptors:

44.5.1 Determine return on investment (ROI) [e.g., cost-benefit analysis] [NS, ISS, IM]

44.5.2 Explain Total Cost of Ownership (TCO) [PSD, NS, ISS, IM]

44.5.3 Define risks and rewards for each option (NS, ISS, IM)

44.5.4 Explain the components of “build versus buy” (PSD, NS, ISS, IM)

44.5.5 Explain processes to compare design versus requirements (NS, ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)
- Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD	I	R	P
IM		I	P

Competency 44.6: Demonstrate knowledge of how systems and products are developed

TPO: Provided a business scenario demonstrate knowledge of how systems and products are developed using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.6.1 Define components that go into the development plan (e.g., hardware, software, communications) [PSD, ISS, NS, IM]
- 44.6.2 Explain what makes a good development plan (e.g., end-user involvement, programming code reviews) [PSD, ISS, NS, IM]
- 44.6.3 Identify documentation requirements in initiation/planning phase as needed (ISS, NS, IM)
- 44.6.4 Explain project status report (ISS, NS, IM)
- 44.6.5 Define purpose of critical milestones and paths (ISS, NS, IM)
- 44.6.6 Discuss need for project phase review (ISS, NS, IM)
- 44.6.7 Report project status (ISS, NS, IM)

Correlated English Language Arts Academic Content Benchmarks

- Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- Use precise mathematical language and notations to represent problem situations and mathematical ideas. (Math. Process F, 8-10)
- Write clearly and coherently about mathematical thinking and ideas. (Math. Process G, 810)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 44.7: Discuss solutions versus requirements

TPO: Provided a business scenario, discuss solutions versus requirements using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.7.1 Explain how unit testing is used to validate requirements (PSD, ISS, IM)
- 44.7.2 Explain the purpose of technical review (ISS, IM)
- 44.7.3 Explain the purpose of end-user solution review (ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- Describe sampling methods and analyze the effects of method chosen regarding how well the resulting sample represents the population. (Data G, 8-10)

Quality Assurance and Testing

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.8: Explain quality assurance processes

TPO: Provided a business scenario, explain quality assurance processes using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.8.1 Discuss the historical evolution of quality assurance initiatives (ISS, NS, IM)
- 44.8.2 Interpret quality management terminology (NS)
- 44.8.3 Identify the role of quality within the organization (ISS, NS, IM)
- 44.8.4 Identify the features and benefits of quality planning (PSD, NS)
- 44.8.5 Discuss the relationship among organizational structures, policies, procedures and quality assurance (NS, IM)
- 44.8.6 Identify successful efforts by industry to improve quality and/or reduce costs (NS)
- 44.8.7 Differentiate between prevention and detection (ISS, NS)

- 44.8.8 Differentiate between variable and attribute data
- 44.8.9 Identify types of control charts
- 44.8.10 Explain how statistical techniques are used to control quality

Correlated Mathematics Academic Content Benchmarks

- Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)
- Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)
- Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)
- Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlations and variability. (Data B, 11-12)
- Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions (Data C, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		P	R

Competency 44.9: Demonstrate knowledge of the testing environment

TPO: Examine a computer repair facility to demonstrate knowledge of the testing environment identify the technical environment and list ten internal and ten external components.

Descriptors:

- 44.9.1 Identify the purpose of integration testing (ISS, NS)
- 44.9.2 Identify the purpose of system testing (ISS, NS)
- 44.9.3 Identify the purpose of security testing (ISS, NS)
- 44.9.4 Identify the purpose of acceptance testing (PSD, ISS, NS)

Implementation Phase

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.10: Describe key components of an implementation plan (e.g., communication, business continuity plan)

TPO: Provided a business scenario describe key components of an implementation plan using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.10.1 Identify turn-back points (e.g., go or no-go) [NS, IM, ISS]
- 44.10.2 Identify new work processes and procedures (PSD, NS, IM, ISS)
- 44.10.3 Identify steps all business units must take to implement (NS, IM, ISS)
- 44.10.4 Identify decision criteria for retiring old solution (i.e., displaced technology) [NS, IM, ISS]

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD		P	R
IM		P	R

Competency 44.11: Explain the value a communication plan can provide to implementation

TPO: Provided with a business scenario, demonstrate knowledge of the testing environment by preparing a test plan with 10 items to test.

Descriptors:

- 44.11.1 Identify communication vehicles
- 44.11.2 Identify components of a communication plan
- 44.11.3 Explain the importance of audience when developing a communication plan
- 44.11.4 Describe types of communication channels (e.g., formal vs. informal)
- 44.11.5 Define stakeholder relationships (e.g., customer, employers, shareholders, suppliers)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use effective speaking strategies for a variety of audiences, situations and purposes. (Communication C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.12: Explain the value a training plan can provide to implementation

TPO: Provided a business scenario, explain the value a training plan can provide to implementation using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.12.1 Identify components of training plan (ISS, IM, NS)
- 44.12.2 Identify common training methodologies (e.g., computer-based, hands on) [ISS, IM, NS]
- 44.12.3 Identify strengths and weaknesses of each methodology (ISS, IM, NS)
- 44.12.4 Identify functions of a training plan (PSD, ISS, IM, NS)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use effective speaking strategies for a variety of audiences, situations and purposes. (Communication C, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		I	P
PSD		I	P
IM		I	P

Competency 44.13: Explain how business continuity plans (e.g., disaster recovery, roll-back) interrelate with implementation plans

TPO: After completion of the required reading and a classroom discussion explain how business continuity plans (e.g., disaster recovery, roll-back) interrelate with implementation plans according to industry standards.

Descriptors:

- 44.13.1 Describe purpose and components of a roll-back plan (e.g., go-no-go) [IM, NS]
- 44.13.2 Describe purpose and components of a fall-back plan (e.g., disaster recovery plan) [PSD, IM, NS]
- 44.13.3 Describe purpose and components of a business continuity plan (IM, NS)

Maintenance/Operations Phase

BIL: Essential: ISS NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.14: Demonstrate knowledge of information technology operations and maintenance Key Indicators

TPO: Provided a business scenario demonstrate knowledge of information technology operations and maintenance key indicators using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.14.1 Describe maintenance and operations phase (ISS, NS, IM)
- 44.14.2 Identify systems operations (ISS, IM)
- 44.14.3 Define problem and modification process (PSD, ISS, IM)
- 44.14.4 Define steps to maintain system (ISS, IM)
- 44.14.5 Revise previous documentation as needed (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.15: Explain the role of maintenance as part of the IT function

TPO: Provided a business scenario explain the role of maintenance as part of the IT function using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.15.1 Define components of maintenance contracts (PSD, ISS, IM, NS)
- 44.15.2 Define upgrade process (ISS, IM, NS)
- 44.15.3 Define Service Level Agreements (SLAs) [ISS, IM, NS]

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.16: Define components of incidence and problem management

TPO: Provided a business scenario define components of incidence and problem management using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.16.1 Define escalation process (NS, IM)
- 44.16.2 Explain different methodologies for event notification (e.g., paging, e-mail) [ISS, PSD, NS, IM]

44.16.3 Explain support contract (ISS, NS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 44.17: Identify components of change management process

TPO: Provided a business scenario identify components of change management process using a prepared case study as a final project in accordance to rubric provided.

Descriptors:

- 44.17.1 Define the change and value of change (ISS, IM, NS)
- 44.17.2 Define when to do change (ISS, IM, NS)
- 44.17.3 Explain what change entails (ISS, IM, NS)
- 44.17.4 Explain the impact of change (ISS, PSD, NS)
- 44.17.5 Contact all affected parties (ISS, IM, NS)
- 44.17.6 Identify back-up plan (IM, ISS, NS)

Unit 45: Business Law and Legal Issues

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	R	P
NS		P	R
PSD	I	P	R
IM		P	R

Competency 45.1: Define intellectual property rights covered by intellectual law

TPO: After completing the required reading, define intellectual property rights covered by intellectual law, with 80% correct response.

Descriptors:

- 45.1.1 Distinguish among the various forms of intellectual property rights (e.g., copyright, patent, trademark, trade secrets) [ISS]
- 45.1.2 Define plagiarism (ISS)
- 45.1.3 Define authorship (ISS)
- 45.1.4 Define work made for hire (ISS)
- 45.1.5 Define fair use (ISS)
- 45.1.6 Differentiate the rights granted under copyright, patent, and trademark (ISS)
- 45.1.7 Identify the rights related to electronic imagery (ISS)
- 45.1.8 Discuss consequences of violation of copyright trademark and patent law (ISS)
- 45.1.9 Identify the liability for invasion of privacy (ISS)
- 45.1.10 Identify the liability for slander and libel (ISS)
- 45.1.11 Identify legal terms related to IT (ISS)
- 45.1.12 Discuss licensing issues (ISS)
- 45.1.13 Discuss confidentiality issues and their liability implications

Correlated English Language Arts Academic Content Benchmarks

- *Use style guides to produce oral and written reports that give proper credit for sources (e.g., words, ideas, images, information) and include an acceptable format for source acknowledgement. (Research D, 8-10; Research D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 45.2: Describe the components of contracts

TPO: After comparing several contracts, describe the components of contracts with the use of notes.

Descriptors:

- 45.2.1 Define statement of work (NS, IM, ISS)
- 45.2.2 Define duration (NS, ISS, IM)
- 45.2.3 Define liabilities (NS, ISS, IM)
- 45.2.4 Define termination clause (NS, ISS, IM)
- 45.2.5 Define service level agreements (PSD, NS, ISS, IM)
- 45.2.6 Define exclusions (NS, ISS, IM)
- 45.2.7 Define warranties ((NS, ISS, IM)
- 45.2.8 Explain dispute resolution (NS, ISS, IM)
- 45.2.9 Define terms and conditions (NS, ISS, IM)

BIL: Essential: ISS NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 45.3: Identify current regulatory issues (e.g., HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, NSA–National Security Act, Homeland Security)

TPO: After completing the required reading, identify current regulatory issues (e.g., HIPAA, Gramm-Leach-Bliley, Sarbanes-Oxley, NSA–National Security Act, Homeland Security) with 80% correct response.

Descriptors:

- 45.3.1 Explain the impact of regulatory compliance issues on the design and development process (PSD, NS, ISS, IM)
- 45.3.2 Define/explain the impact of non-compliance to the company/organization (PSD, NS, IM, ISS)
- 45.3.3 Explain risk of non-compliance to the company/organization (PSD, NS, ISS, IM)

Unit 46: Technical Writing and Documentation

Webxam 82MB.03

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.1: Evaluate technical writing requirements

TPO: Using a case study provided by the teacher, evaluate technical writing requirements based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.1.1 Define/prioritize communication needs (PSD, ISS, IM)
- 46.1.2 Resolve conflicting requirements (ISS)
- 46.1.3 Specify project objectives (PSD, ISS)
- 46.1.4 Determine the size and specifics of the work to be completed (PSD, ISS)
- 46.1.5 Estimate time, materials, and capabilities needed to complete assignment (ISS)
- 46.1.6 Identify criteria for successful completion of project (ISS)
- 46.1.7 Evaluate strengths and weaknesses of completed project (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.2: Write technical reports

TPO: Using a case study provided by the teacher, write a technical report based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.2.1 Determine audience (PSD, ISS, IM)
- 46.2.2 Access needed information using standard references and sources (ISS, IM)

- 46.2.3 Identify type of report needed (ISS, IM)
- 46.2.4 Compile relevant data (ISS, IM)
- 46.2.5 Organize data into charts and graphs (ISS, IM)
- 46.2.6 Analyze data (ISS, IM)
- 46.2.7 Draw conclusions from data analysis (ISS, IM)
- 46.2.8 Outline report (ISS, IM)
- 46.2.9 Draft report (ISS, IM)
- 46.2.10 Edit report (e.g., check spelling, grammar, punctuation, sentence structure, accuracy of content) [ISS, IM]
- 46.2.11 Review report with peers (ISS, IM)
- 46.2.12 Revise report as needed based on peer feedback (ISS, IM)
- 46.2.13 Proofread revised report (ISS, IM)
- 46.2.14 Present reports (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Determine the usefulness of organizers and apply appropriate pre-writing tasks. (Writing Process B, 8-10)*
- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*
- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure. (Writing Applications D, 11-12)*
- *Use revision strategies to improve the style, variety of sentence structure, clarity of controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas. (Writing Process C, 8-10; Writing Process C, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Process D, 8-10)*
- *Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics. (Writing Process F, 8-10)*

Correlated Mathematics Academic Content Benchmarks

- *Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (Data D, 8-10)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)*
- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)*
- *Describe sampling methods and analyze the effects of method chosen regarding how well the resulting sample represents the population. (Data G, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data B, 11-12)*

- *Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions.(Data C, 11-12)*
- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 810)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.3: Conduct technical research

TPO: Using a case study provided by the teacher, conduct technical research, based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.3.1 Identify target audience (PSD, ISS, IM)
- 46.3.2 Define research questions (ISS, IM)
- 46.3.3 Determine priorities for the information that should be gathered (ISS, IM)
- 46.3.4 Identify potential sources of information (ISS, IM)
- 46.3.5 Target audience/user group as a key information source (ISS, IM)
- 46.3.6 Identify subject matter experts (ISS, IM)
- 46.3.7 Evaluate potential sources of information based on established criteria (e.g., affordability, relevance) [ISS, IM]
- 46.3.8 Conduct interviews with selected human information sources (ISS)
- 46.3.9 Gather information from selected print and electronic sources (ISS)
- 46.3.10 Determine the accuracy and completeness of the information gathered (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)*
- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10)*
- *Evaluate the usefulness and credibility of data and sources, and synthesize information from multiple sources. (Research C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	R	P
IM	I	P	R

Competency 46.4: Design technical documentation

TPO: Using a case study provided by the teacher, design technical documentation based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.4.1 Define purpose of documentation (PSD, ISS)
- 46.4.2 Specify standards for documentation, including critical success criteria (ISS)
- 46.4.3 Identify delivery options (ISS)
- 46.4.4 Evaluate cost-effectiveness of each delivery option (ISS)
- 46.4.5 Select tools appropriate for task purpose (ISS)
- 46.4.6 Plan information flow (ISS)
- 46.4.7 Select writing style and tone appropriate for given documentation (ISS)
- 46.4.8 Determine level of detail needed (ISS)
- 46.4.9 Identify visuals appropriate for given documentation (ISS)
- 46.4.10 Provide feedback on design to development team/individual (ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience. (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Determine the usefulness of organizers and apply appropriate pre-writing tasks. (Writing Process B, 8-10)*
- *Select and use an appropriate organizational structure to refine and develop ideas for writing. (Writing Process B, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 46.5: Develop technical documentation

TPO: Using a case study provided by the teacher, develop technical documentation based upon the criteria specified in the assessment instrument.

Descriptors:

- 46.5.1 Determine audience (ISS, IM)
- 46.5.2 Identify parameters (ISS, IM)
- 46.5.3 Interpret specifications or drawings for target audience (ISS, IM)
- 46.5.4 Record process (e.g., flowchart, step-by-step narrative) [ISS, IM]
- 46.5.5 Record data (ISS, IM)
- 46.5.6 Maintain test logs (PSD, ISS, IM)
- 46.5.7 Compile cumulative reference/record (ISS, IM)
- 46.5.8 Measure compliance with established parameters (ISS, IM)
- 46.5.9 Verify the accuracy and validity of the information (ISS, IM)
- 46.5.10 Select and organize information (ISS, IM)
- 46.5.11 Present content in clear and concise way (ISS, IM)
- 46.5.12 Employ presentation tools and techniques appropriate for the given documentation (ISS, IM)
- 46.5.13 Obtain feedback on the information provided and its technical accuracy (ISS, IM)
- 46.5.14 Test documentation for usability (ISS, IM)
- 46.5.15 Edit documentation for readability, grammar, and usage (ISS, IM)
- 46.5.16 Maintain required logs (ISS, IM)
- 46.5.17 Track expenses involved (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience. (Writing Process A, 8-10; Writing Process A, 11-12)*
- *Evaluate the usefulness and credibility of data and sources. (Research B, 8-10)*
- *Evaluate the usefulness and credibility of data and sources, and synthesize information from multiple sources. (Research C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*
- *Give presentations using a variety of delivery methods, visual displays and technology. (Communication G, 8-10; Communication F, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Process D, 8-10)*
- *Apply tools to judge the quality of their writing. (Writing Process E, 8-10)*
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis. (Data E, 8-10)*
- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data F, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12) Design and perform a statistical*

experiment, simulation or study, collect and interpret data, and use descriptive statistics to communicate and support predictions and conclusions. (Data C, 11-12)

- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 810)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretations of solution within the model, and validation to original problem situation. (Math. Process J, 11-12)*

Unit 47: Professional Practices

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	P	R
IM		I	P

Competency 47.1: Identify legal and ethical behavior

TPO: Given several scenarios, identify legal and ethical behaviors by stating which behavior applies and why to 80% accuracy.

Descriptors:

- 47.1.1 Differentiate between legal and ethical behavior (ISS, IM)
- 47.1.2 Explain terms, principles, and characteristics of legal and ethical behavior (e.g., loyalty, discretion, solicitation, competitor, supplier) [ISS, IM]
- 47.1.3 Explain legal ramifications of breaching rules and regulations (ISS, IM)
- 47.1.4 Explain the effects and consequences of unethical and/or unlawful behavior (ISS, IM)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		P	R
NS		P	R
PSD	I	P	R
IM	I	P	R

Competency 47.2 Explain professional responsibilities

TPO: Using current news events, explain professional responsibilities using a grid that displays the behavior, if the behavior is ethical or not and defend your answer.

Descriptors:

- 47.2.1 Explain the need for professional and ethical standards
- 47.2.2 Explain responsibility of the individual to apply ethical standards
- 47.2.3 Identify responsibility to clients(s) and employer(s)
- 47.2.4 Explain importance of conflict resolution in the workplace

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 47.3: Explain the role of the IT professional in maintaining customer satisfaction

TPO: Provided several scenarios, explain the role of the IT professional in maintaining customer satisfaction according to criteria discussed in class.

Descriptors:

- 47.3.1 Explain the nature of positive customer/client relations (ISS, IM)
- 47.3.2 Describe the importance of all customers to the business (PSD, ISS, IM)
- 47.3.3 Explain the importance of interaction with customers in a professional manner (ISS, IM)
- 47.3.4 Explain the importance of maintaining customer base (ISS, IM)
- 47.3.5 Determine appropriate communication vehicles (phone, e-mail, face-to-face) [PSD, ISS, IM]
- 47.3.6 Differentiate internal vs. external customer service (cost of existing versus new) [ISS, IM]
- 47.3.7 Discuss the role of company image (ISS, IM)
- 47.3.8 Discuss the role of customer feedback in customer satisfaction (ISS, IM)
- 47.3.9 Define function of call center (PSD, ISS, IM)
- 47.3.10 Identify customer expectations (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 47.4: Explain the importance of teams in achieving IT project goals

TPO: Given a group project, explain the importance of teams in achieving IT project goals using a project time-line working with a group versus working alone.

Descriptors:

- 47.4.1 Identify desired group and team behavior in an IT context (PSD, ISS, IM)
- 47.4.2 Explain the importance of cross-functional teams in the IT environment (ISS, IM)
- 47.4.3 Define roles/responsibilities within the group decision making process (PSD, ISS, IM)
- 47.4.4 Identify ways to assess team productivity and results (ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- *Connect statistical techniques to applications in workplace and consumer situations. (Data D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM	I	P	R

Competency 47.5: Explain the importance of professional behavior in the IT environment

TPO: After reviewing a company's employee policy, explain the importance of professional behavior in the IT environment correctly identifying at least six professional behaviors addressed in the company policy.

Descriptors:

- 47.5.1 Identify appropriate resources for company policies affecting professional behavior (e.g., organizational policies, personnel handbooks, and manuals) [PSD, ISS]
- 47.5.2 Discuss how specific organizational policies and rules influence a specific work situation (ISS)
- 47.5.3 Explain the importance of self-discipline, positive attitude and integrity in a work situation (e.g., attendance, personal appearance) [PSD, ISS]
- 47.5.4 Explain the importance of flexibility and willingness to learn new skills and knowledge (PSD, ISS)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS	I	R	P
NS		P	R
PSD		I	P
IM	I	P	R

Competency 47.6: Explain the importance of health and safety standards and concepts in the IT workplace

TPO: Using the Internet, explain the importance of health and safety standards and concepts in the IT workplace with a two page report that discusses the importance of health and safety standards and concepts in the IT workplace. Embed a graph in your paper that shows the relationship between health, safety and productivity.

Descriptors:

- 47.6.1 Explain the relationship between health, safety and productivity (ISS)
- 47.6.2 Identify sources of safety information (e.g., company procedural manuals, documentation, standards, flowcharts) [ISS]
- 47.6.3 Explain the importance of maintaining a safe work area (ISS)

47.6.4 Explain how ergonomics and repetitive strain injury impact IT professionals (PSD, ISS)

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary E, 11-12)*

Unit 48: Basic Business Concepts

Webxam 82MB.02

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD	I	R	P
IM		I	P

Competency 48.1: Explain business ownership

TPO: Given a business concept, explain the type of business ownership you should organize under and identify five pros and five cons to this type of organization.

Descriptors:

- 48.1.1 Define types of business ownership (e.g., sole proprietorship, partnership) [PSD, ISS, IM]
- 48.1.2 Explain the advantages and disadvantages of the different forms of business ownership (ISS, IM)
- 48.1.3 Identify variations in ownership forms (ISS, IM)
- 48.1.4 Explain how business organization ownership can evolve over time (ISS, IM)

Correlated English Language Arts Academic Content Benchmark

- Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 48.2: Explain basic business organization and structure

TPO: After reading assigned materials, explain basic business organization and structure and pass the related quiz to at least 80% accuracy.

Descriptors:

- 48.2.1 Differentiate between divisional and departmental structures (e.g., customer, geographic and product) [PSD, ISS, IM]
- 48.2.2 Identify types of organizational structures (e.g., organic, matrix, mechanistic) [PSD, ISS, IM]

48.2.3 Explain how internal and external forces impact the requirements for tech or service implementation (e.g., size, complexity, profitability) [PSD, ISS, IM]

Correlated Mathematics Academic Content Benchmarks

- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Math. Process H, 8-10)*
- *Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of mathematical model, interpretation of solution with the model, and validation to original problem situation. (Math. Process J, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.3: Discuss the role of IT in meeting business strategic objectives

TPO: Using an annual report, prepare a chart that summarizes the company goals and objectives, and stakeholders. Discuss how IT is used in the company (production, accounting, e-commerce).

Descriptors:

- 48.3.1 Identify common sources outlining strategic business objectives (NS, ISS, IM)
- 48.3.2 Define typical business objectives (PSD, ISS, IM)
- 48.3.3 Identify ways in which business objectives are measured (e.g., key performance indicators) [NS, ISS, IM]
- 48.3.4 Identify business stakeholders (e.g., shareholders, customers, suppliers) (NS, ISS, IM)
- 48.3.5 Discuss how IT functions impact business objectives (NS, ISS, IM)
- 48.3.6 Discuss obstacles in measuring the impact of IT functions on business objectives (NS, ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		P	R
PSD		I	P
IM		I	P

Competency 48.4: Explain how IT functions interface with other business functions

TPO: After reading assigned materials explain how IT functions interface with other business functions and pass related quiz to at least 80% accuracy.

Descriptors:

- 48.4.1 Explain the role of IT in the business organization (PSD, ISS, IM)
 48.4.2 Explain how IT interfaces with the human resource function (ISS, IM)
 48.4.3 Explain how IT interfaces with the finance and accounting functions (ISS, IM)
 48.4.4 Explain how IT interfaces with the production/manufacturing functions (ISS, IM)
 48.4.5 Explain how IT interfaces with the sales, marketing, and distribution functions (ISS, IM)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.5: Determine factors affecting business risk

TPO: Identify a business in your neighborhood and list at least ten factors that could affect the business future and profitability

Descriptors:

- 48.5.1 Define business risk (PSD, NS, ISS, IM)
 48.5.2 Identify types of business risks (NS, ISS, IM)
 48.5.3 Describe ways to minimize business risks (NS, ISS, IM)
 48.5.4 Identify factors affecting a business' profit (NS, ISS, IM)

Correlated Mathematics Academic Content Benchmarks

- *Explain difference among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collections and analysis. (Data E. 810)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data A, 11-12)*
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Math. Process B, 8-10)*

BIL: Recommended: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	R
PSD			I
IM		I	P

Competency 48.6: Explain basic accounting concepts

TPO: Given financial statements and corresponding worksheet, explain basic accounting concepts by completing the worksheet to 80% accuracy.

Descriptors:

- 48.6.1 Define accounting and explain the purpose of the accounting system
- 48.6.2 Explain basic accounting principles and applications
- 48.6.3 Identify appropriate accounting concepts and techniques for acquisition, depreciation, and disposal of property, plant, and equipment

Correlated English Language Arts Academic Content Benchmark

- *Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases. (Number D, 11-12)*

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.7: Demonstrate knowledge of cost-benefit analysis

TPO: After reading the required text and a class discussion, demonstrate knowledge of cost-benefit analysis correctly matching 80% of the associated terms to their corresponding definitions on a worksheet.

Descriptors:

- 48.7.1 Define cost and benefit analyses (NS, PSD, IM, ISS)
- 48.7.2 Differentiate between nonrecurring costs and recurring costs (IM, ISS)
- 48.7.3 Identify major cost categories (e.g., hardware, software, communication services, training, interface conversion) [IM, ISS]
- 48.7.4 Differentiate between tangible benefits and intangible benefits (IM, ISS)
- 48.7.5 Explain why intangible benefits are included in analyses (IM, ISS)
- 48.7.6 Identify tools used to rank and compare alternative costs and benefits (e.g., Net Present Value, Return on Investment, Discounted Payback Period) [ISS]
- 48.7.7 Execute full cost-benefit analysis (ISS)

BIL: Essential: ISS, NS, PSD, IM

EDU:	10	12	AD
ISS		I	P
NS		I	P
PSD		I	P
IM		I	P

Competency 48.8: Explain the vendor management process

TPO: Provided several examples of RFP's explain the vendor management process according to criteria presented in class.

Descriptors:

- 48.8.1 Define components of a RFP (Request for Proposals) [e.g., transmittal letter, instructions and procedures, and requirements and specifications] (NS, ISS, IM)
- 48.8.2 Identify basic criteria for vendor selection (NS, PSD, ISS, IM)
- 48.8.3 Identify common forms of vendor-buyer agreements (NS, ISS, IM)
- 48.8.4 Identify common problems in the vendor management process in the IT environment (e.g., compliance, confidentiality and non-disclosure) [NS, ISS, IM]

Computer Networking Technology Curriculum Mapping

WEBXAM 82MB_	itWorks COURSE OF STUDY UNITS	Junior Year	Junior Year	Senior Year	Senior Year
		DISCOVERY 1 Networking for Home and Small Businesses Chapters	DISCOVERY 2 Working for a Small-to- Medium Business or ISP Chapters	DISCOVERY 3 Introducing Routing and Switching in the Enterprise Chapters	DISCOVERY 4 Designing and Supporting Computer Networks Chapters
01	Unit 1	1, 10	1		
01	Unit 2	2, 10			
09	Unit 4	9	2		
04	Unit 16	1, 8, 9, 10			
04	Unit 17	4			
05	Unit 18	3, 4, 5, 6, 9, 10	3, 4, 9	3, 4, 7	1, 5, 6
07	Unit 19	3, 4, 6	6, 7	1, 2	1, 4, 5
07	Unit 20	6, 8		9	
06	Unit 21	8	6	3, 5, 6, 7	1, 4, 5
09	Unit 22	10	3, 5, 7, 10	2, 7, 9, 10	2, 3, 5, 7, 8
05	Unit 23	8	8	4	

Computer Networking Technology Curriculum Mapping

WEBXAM 82MB_	itWorks COURSE OF STUDY UNITS	Junior Year	Junior Year	Senior Year	Senior Year
		DISCOVERY 1 Networking for Home and Small Businesses Chapters	DISCOVERY 2 Working for a Small-to- Medium Business or ISP Chapters	DISCOVERY 3 Introducing Routing and Switching in the Enterprise Chapters	DISCOVERY 4 Designing and Supporting Computer Networks Chapters
05	Unit 24	8	7, 8	3, 7, 8, 9	2, 5
07	Unit 25	7			
06	Unit 26	4			
08	Unit 27				2
08	Unit 30	9	9	9	
02	Unit 44	10	10	10	2, 10
02	Unit 45	10	10	10	9, 10
03	Unit 46	10	10	10	9, 10
02	Unit 47	10	10	10	10
02	Unit 48	10	10	10	10

CCNA Discovery Curriculum Outline

Chapter	Networking for Home and Small Businesses Junior Year	Working at a Small-to-Medium Business or ISP Junior Year	Introducing Routing and Switching in the Enterprise Senior Year	Designing and Supporting Computer Networks Senior Year
1	Personal Computer Hardware	The Internet and Its Uses	Networking in the Enterprise	Introducing Network Design Concepts
2	Operating Systems	Help Desk	Exploring the Enterprise Network Infrastructure	Gathering Network Requirements
3	Connecting to the Network	Planning a Network Upgrade	Switching in an Enterprise Network	Characterizing the Existing Network
4	Connecting to the Internet Through an ISP	Planning the Addressing Structure	Addressing in an Enterprise Network	Identifying Application Impacts on Network Design
5	Network Addressing	Configuring Network Devices	Routing with a Distance Vector Protocol	Creating the Network Design
6	Network Services	Routing	Routing with a Link-State Protocol	Using IP Addressing in the Network Design
7	Wireless Technologies	ISP Services	Implementing Enterprise WAN Links	Prototyping the Campus Network
8	Basic Security	ISP Responsibility	Filtering Traffic Using Access Control Lists	Prototyping the WAN
9	Troubleshooting Your Network	Troubleshooting	Troubleshooting an Enterprise Network	Preparing the Proposal
10	Course Summary: Putting It All Together	Course Summary: Putting It All Together	Course Summary: Putting It All Together	Course Summary: Putting It All Together

COMPUTER NETWORKING TECHNOLOGY

PUPIL EVALUATION POLICY

Evaluation of student performance in the Computer Networking Technology Tech Prep program is criterion referenced. The number of competencies mastered will be translated into appropriate grades consistent with the school's grading system and with the District's goals and philosophy.

All students will be evaluated on daily grades – online coursework, participation, tests (both online and traditional), quizzes, presentations, assignments, lab performance, work/field experience, case studies, term papers, individualized research, readings, and competency gain. The grade distribution is as follows:

GRADING SCALE

90% - 100%	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% and below	F

Mastery of the technical skills presented in the first year of Computer Networking is essential for success in the second year program. Students who do not earn a C or better at the conclusion of the first year of the program will be asked to review their career choice with the Career Prep guidance counselor.

Students will be evaluated frequently, with emphasis on competency and performance. The instructor(s) will compile performance records as needed for employment recommendations. Work/field experience is the early placement program for second-year students.

At completion of the program, each student will receive a Career Passport indicating competencies in which the student is proficient.