Lakeshore Technical College

10-154-104 Introduction to IT

Course Outcome Summary

Course Information

Description Introduction to IT introduces student to IT field to basic concepts and terminology of a computer system hardware and software, Operating Systems (including Mac OS), and Networks; applied skills include: managing computer data files; protecting against computer viruses; creating simple web pages; producing electronic word documents, spreadsheets and presentations; examining techniques of systems analysis and design, programming languages and database systems.

Total Credits 4

Total Hours 90

Course Competencies

1. Demonstrate the ability to use computers

Linked Core Abilities

Communicate effectively
Demonstrate responsible and professional workplace behaviors
Integrate technology
Work cooperatively

Linked Program Outcomes

Manage software

Assessment Strategies

1.1. by completion of learning activities
1.2. by completion of performance assessments
1.3. in the classroom laboratory

Criteria

Your performance will be successful when:

1.1. you identify the basic components of your computer system
1.2. you Identify the major components of the Windows desktop
1.3. you use the mouse and keyboard
1.4. you start and exit a software program
1.5. you use the menu bar, toolbar, and sizing buttons
1.6. you create, save, and print documents using Microsoft Word
1.7. you use a browser
1.8. you use a search engine to find specific information on the Web
1.9. you create, read, and reply to e-mail messages
1.10. you secure your computer for working online
1.11. you take steps to protect your online privacy

Learning Objectives

1.a. Identify the basic components of your computer system
1.b. Identify the major components of the Windows desktop
1.c. Use the mouse and keyboard
1.d. Demonstrate use of peripheral devices
1.e. Start and exit a software program
1.f. Use the menu bar, toolbar, and sizing buttons
1.g. Create, save, and print documents using Microsoft Word
1.h. Use a browser
1.i. Use a search engine to find specific information on the Web
1.j. Create, read, and reply to e-mail messages
1.k. Secure your computer for working online
1.l. Take steps to protect your online privacy

2. Explain how digital devices represent numbers, text, images, and sound

Linked Core Abilities

Demonstrate responsible and professional workplace behaviors
Integrate technology
Respect and appreciate diversity

Linked Program Outcomes

Manage software

Assessment Strategies

2.1. by completion of learning activities
2.2. by completion of performance assessments
2.3. in the classroom laboratory

Criteria

Your performance will be successful when:

2.1. you describe how digital devices represent numbers, text, images, and sound
2.2. you explain the difference between bits and bytes, and the technical meaning of common prefixes

Learning Objectives

2.a. List three technologies that digital devices use to physically store or transmit 1s and 0s and write the numbers 1 through 10 in binary.
2.b. Decipher ASCII text.
2.c. Demonstrate how to use the terms bit, byte, megabyte, megabit, and gigabyte in the context of data storage and digital devices.
2.d. Distinguish between data that would be represented by binary numbers and data that would be represented by ASCII or Unicode and explain how OCR relates to ASCII and Unicode.
2.e. Describe the difference between lossy and lossless compression and demonstrate how to compress a file.
2.f. Describe the process of digital sampling and select the appropriate sampling rate for a digital audio recording.
2.g. Identify digital audio files by their file name extensions and convert digital audio files from one format to another.
2.h. Understand why most audio files are compressed and how this affects sound quality.
2.i. Decide when to download, live stream, or stream music on demand and explain the difference between digital audio and MIDI.
2.j. Explain how Siri and similar services work.
2.k. Describe the differences between bitmap and vector graphics file formats.
2.l. Explain how pixel color is represented in decimal, hexadecimal, and binary and calculate the size of a bitmap file given its resolution.
2.m. Decide which graphics format to use for school, work, or personal projects and list six popular bitmap file formats.
2.n. Describe how cameras and scanners produce digital images.
2.o. Explain how 3-D images are created.
2.p. Describe the RGB and CMYK color models and explain what a color histogram represents and how to use one.

2.q. Identify vector graphics used on Web sites and social media.
2.r. Based on the characteristics of vector graphics, determine when they are more suitable for a project than bitmaps.
2.s. Convert a vector drawing into a bitmap.
2.t. Explain the process of rendering a 3-D wireframe into an image and identify the key difference between rendering 3-D graphics for computer games and creating special effects for movies.
2.u. Recognize digital video files by their file name extensions.
2.v. List the video formats that are commonly used on the following: YouTube, iPhone, Android phone, television, Web browsers.
2.w. List factors that affect the size and quality of digital videos and differentiate between interlaced and progressive scan.
2.x. Explain the contents of a video container.
2.y. State the most commonly used aspect ratios and explain the purpose of a codec.

3. Explain digital device options, their uses, and how their internal and external components interact

Linked Core Abilities

Apply sustainable practices
Demonstrate responsible and professional workplace behaviors
Integrate technology
Work cooperatively

Linked Program Outcomes

Manage software

Assessment Strategies

3.1. Oral Presentation
3.2. Quiz
3.3. in the classroom laboratory

Criteria

You will know you are successful when:

3.1. your oral presentation describes a digital device's technical specifications
3.2. your oral presentation describes a digital device's microprocessor, data control and storage structures
3.3. your oral presentation includes at least one image of your digital device
3.4. your oral presentation describes a digital device's software
3.5. your oral presentation includes promotional materials for your digital device

Learning Objectives

3.a. Define the function and major components of a computer
3.b. Describe the major computer categories, form factors and operating systems
3.c. Identify a microprocessor's functional components
3.d. Describe the different types of memory and the boot process
3.e. Compare the different types of device storage systems
3.f. Identify a computer's input and output technologies

4. Explain the different types of networks, how to access these networks, and how data is transmitted and received

Linked Core Abilities

Communicate effectively
Demonstrate responsible and professional workplace behaviors
Integrate technology
Work cooperatively

Linked Program Outcomes

Manage software

Assessment Strategies

4.1. by completion of learning activities
4.2. by completing a quiz
4.3. in the classroom laboratory

Criteria

You will know you are successful when:

4.1. you describe the characteristics of PANs, NANs, LANs, MANs, and WANs
4.2. you diagram the five most common network topologies
4.3. you list the types of cables and other links typically used for data communications networks
4.4. you list network devices and explain the role of each one
4.5. you describe the role of communications protocols
4.6. you explain the difference between packet switching and circuit switching technology
4.7. you list various ways to share files over a LAN
4.8. you list security measures for wired and wireless networks
4.9. you list and define types of encryption that help secure computer networks and data
4.10. Explain how computers access the Internet
4.11. you explain the differences between static IP addresses, dynamic IP addresses, private IP addresses, and domain names
4.12. you explain when and why you might use Ping and Traceroute utilities
4.13. you list the protocols used on the Internet and describe what they are used for
4.14. you describe the advantages and disadvantages of dial-up, cable, DSL, ISDN, satellite, and fixed wireless Internet services
4.15. you differentiate between portable Internet access and mobile Internet access
4.16. you identify and describe the most prevalent types of portable Internet access
4.17. you differentiate between WAP and wireless data services
4.18. you explain how Voice over IP works
4.19. you describe how FTP differs from file sharing technologies such as BitTorrent

Learning Objectives

4.a. 1. Recognize the different types of network classifications, transmission media, and communications equipment
4.b. 2. Describe how data is transmitted and received on the Internet
4.c. 3. Explain how devices access the internet
4.d. 4. Identify a local area network's components and topologies
4.e. 5. Describe the different ways a device can share files on a network

5. Explain web basics, browsers, HTML and HTTP

Linked Core Abilities

Communicate effectively
Demonstrate responsible and professional workplace behaviors
Integrate technology

Linked Program Outcomes

Manage software

Assessment Strategies

5.1. by completion of learning activities
5.2. by completion of performance assessments
5.3. in the classroom laboratory

Criteria

You will know you are successful when:

5.1. you describe the roles that HTML, XHTML, HTTP, URLs, browsers, and Web servers play in bringing Web pages to your desktop
5.2. you identify the elements of HTML tags
5.3. you identify various Web browsers
5.4. you describe the purpose for helper applications, plug-ins, and players
5.5. you describe the significance of browser cache
5.6. you explain why cookies are useful in an environment that is based on a stateless protocol, and provide concrete examples of their use
5.7. you identify various Web page authoring tools and discuss their advantages and disadvantages
5.8. you identify elements that typically for a Web page
5.9. you list some advantages and disadvantages of HTML scripts

5.10. you list and describe the elements of a search engine
5.11. you demonstrate that you can use a search engine to locate information on the Web
5.12. you create advanced search queries and correctly format citations for Web-based materials
5.13. you list the protocols used on the Internet and describe what they are used for
5.14. you explain the differences between static IP addresses, dynamic IP addresses, private IP addresses, and domain names

Learning Objectives

5.a. List the four essential technologies that are the foundation of the World Wide Web.
5.b. Summarize the key events in the emergence of the modern Web.
5.c. Draw a diagram showing the hierarchy of the following: Web server, Web sites, Web pages, hypertext links.
5.d. Describe a situation in which bidirectional hypertext links would improve your online research experience.
5.e. Give an example of the URL for a Web site home page, one for a Web page that is stored in a folder, and one for a Web page that is produced based on a query.
5.f. State four rules for correctly typing URLs.
5.g. Define the term linkrot.
5.h. Describe a situation in which you might use a short URL service.
5.i. Explain the difference between a URL and a domain name.
5.j. Identify the following elements of a browser window: address box, refresh and home buttons, back and forward buttons, tabs, and settings menu.
5.k. List four popular browsers.
5.l. State the difference between the default browser and the browser home page.
5.m. Explain the purpose of predictive services.
5.n. Summarize the issue with allowing your browser to store passwords.
5.o. Describe what is in a browser cache and explain how it can affect your privacy.
5.p. Describe what is in a browser's history list.
5.q. Explain how private browsing works.
5.r. Describe the difference between a plugin and an extension, then give two examples of each.
5.s. Sketch out the family tree of HTML and similar markup languages.
5.t. Identify HTML tags and state two of their characteristics.
5.u. Explain the relationship between HTML documents and Web pages.
5.v. List four types of tools for creating Web pages.
5.w. Sketch out the template for a basic HTML document.
5.x. List HTML tags that are commonly allowed in blog posts and comments.
5.y. Describe the purpose of CSS.
5.z. Differentiate inline CSS from internal and external CSS.
5.aa. Describe the differences between static Web pages and dynamic Web pages.
5.bb. Give examples of client-side scripting and server-side scripting.
5.cc. Explain the purpose of a Web hosting service.
5.dd. List three kinds of data that a browser can request using the GET method.
5.ee. Identify the HTTP status codes for requests that are fulfilled and for requests that ask for a nonexistent URL.
5.ff. Explain the relationship between cookies and HTTP's stateless protocol.
5.gg. List four reasons that Web sites use cookies.
5.hh. Describe the difference between session cookies and persistent cookies, and state which one can affect privacy.
5.ii. Summarize the reasons for blocking third-party cookies but not blocking first-party cookies.
5.jj. Identify when your browser is displaying a secure site where it is safe to enter passwords, financial information, and other personal data.
5.kk. Explain how public key encryption works.
5.ll. List three popular search engine Web sites.
5.mm. List the four components of a search engine.
5.nn. Explain how Web crawlers traverse the Web to collect pages for search engines.
5.oo. Provide at least three examples of the invisible Web.
5.pp. Explain the difference between cached pages and live pages.
5.qq. Explain the job of a search engine indexer.
5.rr. List the steps executed by a query processor to respond to a query.
5.ss. State five techniques that can be used for search engine optimization.
5.tt. Give examples of queries using search operators such as AND, OR, NOT, quotation marks, asterisks,

and range dots.
5.uu. Explain the significance of search history to privacy.
5.vv. Explain the difference between search history and browser history.
5.ww. Describe general guidelines for when Fair Use applies to content that you might incorporate in your own work.

6. Analyze different social media platforms and their impact on society.

Linked Core Abilities
Communicate effectively
Demonstrate responsible and professional workplace behaviors
Integrate technology
Respect and appreciate diversity
Work cooperatively

Linked Program Outcomes
Manage software

Assessment Strategies
6.1. by completion of learning activities
6.2. Presentation - Group
6.3. in the classroom laboratory

Criteria

You will know you are successful when:
6.1. you explain how Voice over IP works
6.2. you describe the basic technology underlying chat and instant messaging services
6.3. you explain how an e-mail system works and describe the difference between POP and Web-based e-mail
6.4. you explain how to use social networking tools to convey your personal brand
6.5. you explain how geo-location works
6.6. you use analytic tools to examine social networking data
6.7. you describe the uses for metadata tagging
6.8. you explain the protections for intellectual property and how to comply with the appropriate laws regarding intellectual property when using social media
6.9. you explain the impact of blogs, microblogs and wikis on social media
6.10. you describe best practices for maintaining an online reputations and proper online ethical behavior
6.11. your group presentation describes a new social media service
6.12. your group presentation demonstrates a new social media service
6.13. your group presentation critiques a new social media service, describing any improvements you think are needed
6.14. your group presentation considers target audience, privacy concerns and ease of use of a new social media service

Learning Objectives
6.a. 1. Characterize social media services based on its' social interactions
6.b. 2. Describe different content communities and the ways intellectual property are protected
6.c. 3. Articulate the features of text based communities
6.d. 4. Classify online communication tools and protocols
6.e. 5. Summarize best practices for managing an online identity

7. Examine operating systems, apps, productivity software and file management techniques

Linked Core Abilities
Demonstrate responsible and professional workplace behaviors
Integrate technology

Linked Program Outcomes
Manage software

Assessment Strategies
7.1. by completion of learning activities
7.2. by completion of performance assessments

7.3. in the classroom laboratory

Criteria

You will know you are successful when:

7.1. you describe the way software is categorized and identify the purpose for each major software category
7.2. you explain the key features and uses for word processing, desktop publishing, and Web authoring software
7.3. you describe the major features of spreadsheet software
7.4. you describe the key features of database software
7.5. you list the types of software available for graphics video, music, education and reference, entertainment, and business
7.6. you list the guidelines that are important for software shoppers
7.7. you describe the rights granted by copyright law, commercial software licenses, shareware licenses, freeware licenses, open source licenses, and public domain software
7.8. you explain how to install and uninstall software, whether it is supplied on CDs or as a Web download
7.9. you differentiate between local, portable, and Web applications
7.10. you describe the purpose of software updates, patches, and service packs
7.11. you create valid names for file and folders, plus demonstrate that you can construct and trace file paths
7.12. you demonstrate application software and operating system utilities file management features
7.13. you demonstrate that you can implement a viable backup and restore plan
7.14. you compare the advantages and disadvantages of using tapes, floppy disks, a second hard disk, CDs, networks, and Web sites for backups
7.15. you explain the importance of a recovery disk
7.16. you describe the way operating systems handle each computer resource
7.17. you identify operating systems used on today's personal computers, PDAs, and servers
7.18. you explain the significance of multitasking, multithreading, and multiprocessing
7.19. you give examples of tasks that might benefit from dual booting or virtual machine capability

Learning Objectives

7.a. Draw a hierarchical diagram that illustrates the three main categories of software and their subcategories.
7.b. State four best practices for obtaining software.
7.c. Distinguish between software updates and upgrades.
7.d. List four pricing models commonly used in the software industry.
7.e. Explain why most software is licensed.
7.f. Describe the difference between proprietary software and public domain software.
7.g. List and describe three types of commercial software licenses.
7.h. Create a chart comparing freeware, demoware, and shareware.
7.i. Name two popular open source software licenses.
7.j. List at least five warning signs that software is pirated.
7.k. List and describe four categories of operating systems.
7.l. Explain the purpose of an operating system kernel and name the operating system kernels that were used to develop Windows and OS X.
7.m. List five digital device resources that are managed by the operating system.
7.n. Define the terms multitasking, multiprocessing, and multithreading.
7.o. Explain how memory leaks develop and why they are a problem.
7.p. Give an example of a buffer that is managed by the operating system.
7.q. Summarize the strengths and weaknesses of the Windows operating system.
7.r. Summarize the strengths and weaknesses of OS X.
7.s. List three ways in which iOS and Android are the same and two ways in which they differ.
7.t. Explain why Chrome OS is considered a thin client.
7.u. Provide an example of a situation that would benefit from the use of a virtual machine.
7.v. Describe two ways in which Web apps differ from mobile apps.
7.w. List four advantages and three disadvantages of Web apps.
7.x. Describe the installation process for mobile apps.
7.y. Explain why iPhone owners might want to jailbreak their devices.
7.z. State whether the following file extensions are associated with PCs or Macs: .exe, .app, .dll, .dmg.
7.aa. Describe what happens in each of the seven steps in the installation process for PC software.
7.bb. Describe the process for installing software on Macs.
7.cc. Explain why portable software pertains to PCs but not to Macs.

7.dd. Summarize the different procedures necessary to uninstall software on PCs and Macs.
7.ee. List three applications that are the core of an office suite.
7.ff. Describe three features of word processing software that help improve the quality of writing and three features that improve the format of documents.
7.gg. Provide an example of a what-if analysis.
7.hh. Give an example of a spreadsheet formula that uses mathematical operators and cell references.
7.ii. Describe a formula that requires an absolute reference.
7.jj. Identify fields and records in a database table.
7.kk. Provide an example of a database that would have two or more related tables.
7.ll. List five commonly used features of presentation software.
7.mm. List five file naming conventions.
7.nn. Explain how storage devices on PCs are named or designated by device letters.
7.oo. Identify disk partitions.
7.pp. Write out the complete file path for any file that exists on a digital storage device.
7.qq. Identify the basic elements of Windows File Explorer and OS X Finder.
7.rr. Explain how operating systems use default applications.
7.ss. State the difference between a physical storage model and a logical storage model.
7.tt. Describe why an operating system uses an index file.
7.uu. Explain what the operating system does when you move a file to the Recycle Bin and when you permanently delete a file.

8. Evaluate the threats to digital security

Linked Core Abilities

Demonstrate responsible and professional workplace behaviors

Linked Program Outcomes

Manage software

Assessment Strategies

8.1. by completion of learning activities
8.2. by completion of performance assessments
8.3. in the classroom laboratory

Criteria

You will know you are successful when:

8.1. you provide examples of single-factor and two-factor authentication
8.2. you describe how hackers can steal passwords
8.3. you list the principles of creating secure passwords and keeping the safe
8.4. you list and define types of encryption that help secure computer networks and data
8.5. you identify security precautions you can take to avoid cookie exploits, pharming, spam, and phishing
8.6. you explain the motivations, methods, goals, and techniques behind a social engineering attack
8.7. you use tools and techniques to ensure safe browsing activities
8.8. you use encryption techniques to protect individual files or entire storage volumes
8.9. you use encryption tools for desktop and mobile operating systems
8.10. you describe the types of malware and how to prevent a device from being infected
8.11. you explain online intrusion and the hardware and software that can prevent the intrusions from happening
8.12. you provide examples of intrusion threats
8.13. you explain how a digital certificate works

Learning Objectives

8.a. Explain the elements of encryption.
8.b. Describe the characteristics of strong and weak passwords and the advantages and disadvantages of password managers.
8.c. Describe various types of computer viruses and how they are spread.
8.d. Describe anti virus software and how it works.
8.e. Explain how online intrusions occur, types of online intrusions and how a DDoS attack takes place.
8.f. Explain the purpose and importance of personal firewalls.
8.g. List types of intercept exploits, address spoofs and digital certificate encryption techniques.
8.h. Discuss the important aspects of social engineering and how to prevent it.

9. Examine the computer industry, tech careers, laws and ethics

Linked Core Abilities

Apply sustainable practices
Demonstrate responsible and professional workplace behaviors
Integrate technology
Respect and appreciate diversity

Linked Program Outcomes

Manage software

Assessment Strategies

9.1. by completion of learning activities
9.2. by completion of performance assessments
9.3. in the classroom laboratory

Criteria

You will know you are successful when:

9.1. you outline the development of calculating and computer devices, beginning with simple counting aides and continuing through developments that led to today's computer technology
9.2. you describe the hardware, software, and operating system characteristics for computer prototypes and the four generations of computers
9.3. you list the factors that changed personal computers from hobbyists' kits to widely used productivity and communications tools
9.4. you describe the role of the computer and IT industries in today's global economy
9.5. you explain the life cycle of typical hardware and software products
9.6. you discuss the advantages and disadvantages of various marketing channels for consumers who want to purchase computers and related products
9.7. you summarize the job outlook and working conditions for computer professionals
9.8. you differentiate between computer engineering, computer science, information systems, information technology, and software engineering degree programs
9.9. you demonstrate how to create a resume that works in today's technology-driven job market
9.10. you describe the professional resources available to computer professionals who are faced with ethical decisions
9.11. you list health risks that are suspected of being linked to the use of computers and other digital devices
9.12. you describe ergonomic principles of setting up computer work areas

Learning Objectives

9.a. Explain how algorithms apply to calculators.
9.b. Describe various mechanical calculators and prototype computers.
9.c. Discuss the history of personal computers leading to todays' technologies.
9.d. Describe the evolution of the telecom industry and the technologies involved in cellular service.
9.e. List occupations in typical IT departments and give examples of titles used in career advancement in a tech job.
9.f. Explain the merits of college degrees, certifications, internships, and other IT training paths.
9.g. Describe the purpose of laws affecting the ICT industry.
9.h. Explain and explore the types of ethical decisions and responsibilities technology professionals need to make.

10. Explain information systems analysis and design

Linked Core Abilities

Communicate effectively
Demonstrate responsible and professional workplace behaviors
Integrate technology

Linked Program Outcomes

Manage software

Assessment Strategies

10.1. by using the course textbook and accompanying BookOnCD
10.2. by completion of learning activities

10.3. by completion of performance assessments
10.4. in the classroom laboratory

Criteria

Your performance will be successful when:

10.1. you describe how information systems help organizations fulfill their missions, deal with threats, and take advantage of opportunities
10.2. you contrast and compare the characteristics of transaction processing systems, management information systems, decision support systems, and expert systems
10.3. you apply the PIECES framework to classify problems that reduce the effectiveness of an information system
10.4. you describe various models for the system development life cycle (SDLC), and explain the focus of the structured, information engineering, object-oriented, and rapid application development approaches to system development
10.5. you list the activities that take place in each phase of the system development life cycle
10.6. you describe alternative hardware and software solutions that a project team might encounter
10.7. you explain the difference between unit testing, integration testing, system testing, and acceptance testing.
10.8. you describe the advantages and disadvantages of direct, parallel, phased, and pilot conversion techniques.
10.9. you list the major threats to data stored on corporate information systems
10.10. you list guidelines for mitigating the effects of corporate identify theft

Learning Objectives

10.a. Outline how an organization's Information systems fit into its' mission, strategy and operational planning.
10.b. Describe the characteristics of expert systems and how informations systems play into the decision making process.
10.c. Describe the various enterprise applications organizations use to manage and monitor their business.
10.d. Describe the role of the computer and IT industries in today’s global economy
10.e. Explain the systems analysis process and and how it fits into other business practices.
10.f. Discuss the design phase of system development and methods of implementation.
10.g. List the types of disasters that threaten informations systems and how a data center can reduce those risks.
10.h. Summarize the elements of a disaster recovery plan.
10.i. Explain security measures that protect data from breaches and the steps data breach victims should follow.

11. Summarize uses of databases

Linked Core Abilities

Demonstrate responsible and professional workplace behaviors
Integrate technology

Linked Program Outcomes

Manage software

Assessment Strategies

11.1. by using the course textbook and accompanying BookOnCD
11.2. by completion of learning activities
11.3. by completion of performance assessments
11.4. in the classroom laboratory

Criteria

Your performance will be successful when:

11.1. you define basic database terminology, such as fields, records, and record types, and cardinality
11.2. you describe six database models and their applications
11.3. you explain the capabilities of various data management tools, such as commercial applications, word processing software, spreadsheet software, file management software, and database management software
11.4. you describe various ways to provide access to databases over the Web
11.5. you describe how to add records, delete records, search for information, update fields, and

simultaneously access data from multiple tables using SQL queries
11.6. you start Microsoft Access and open, create, save, view, and close a database
11.7. you create a table, apply validation rules, save a table, enter data in a table, close a table, examine table view modes, and delete a table
11.8. you insert, delete, move, and rename fields, edit field properties, set a primary key, and create a single or multiple field index
11.9. you sort, filter, and navigate through records, move columns, and modify column width
11.10. you create and delete table relationships
11.11. you preview a table, set print options, and print a table
11.12. you create forms by using AutoForm and the Form Wizard, and switch between views
11.13. you enter data in a form, modify form controls and properties, align form controls, use forms to modify data, and save, close, and delete a form
11.14. you find, sort, and filter records in a form
11.15. you create and run a table query, modify a query to add fields, specify or modify criteria in a query, and close and delete a query
11.16. you create a report by using a query and the Report Wizard, save and close a report, and examine report view modes
11.17. you group and sort records, summarize information, modify the appearance of a report, add headers and footers to a report, and delete a report

Learning Objectives

11.a. Describe the different types and structures of databases
11.b. Provide an overview of tools for working with data, applications based on databases and other data management features.
11.c. List security measures for databases and categories of database clients
11.d. Explore various areas of database design including data types, data entry errors, and best principles for designing a database.
11.e. List the principles for creating effective report templates
11.f. Describe how to add records, delete records, search for information, update fields, and simultaneously access data from multiple tables using SQL queries
11.g. Explain how database vulnerabilities affect individuals and organizations
11.h. Describe the elements that make up what is considered big data.
11.i. List the characteristics of NoSQL, dynamic scaling and a key-value data model
11.j. Demonstrate different retrieval strategies for databases.

12. Analyze the roles of computer programmers and software engineers in information technology

Linked Core Abilities

Demonstrate responsible and professional workplace behaviors
Integrate technology

Linked Program Outcomes

Manage software

Assessment Strategies

12.1. by using the course textbook and accompanying BookOnCD
12.2. by completion of learning activities
12.3. by completion of performance assessments
12.4. in the classroom laboratory

Criteria

Your performance will be successful when:

12.1. you describe the evolution of programming languages
12.2. you describe the role and importance of computer programmers and software engineers
12.3. you categorize today's popular computer programming languages by generation
12.4. you categorize today's popular computer programming languages by paradigm
12.5. you describe the difference between programming and software engineering
12.6. you describe the elements of a problem statement
12.7. you describe the three different methodologies
12.8. you list types of errors that may be encountered in program testing
12.9. you explain the difference between compilers and interpreters

Learning Objectives

12.a. Describe the different methodologies used in programming.
12.b. Explain constants, variables, formal methods and defensive programming.
12.c. Identify various programming tools, types of languages and popular programming paradigms.
12.d. Explain how algorithms, diagrams, and other control structures are used in the procedural programming paradigm.
12.e. Define the term algorithm and describe how it relates to procedural programming
12.f. Explain objects, classes and the relationship between methods and messages in an object oriented program.
12.g. List three object oriented programming languages and explain how the concept of encapsulation relates to abstraction.
12.h. Explain how the declarative paradigm differs from procedural and object oriented paradigms.
12.i. Explore Prolog, a declarative programming language.