

# *Course of Study*

## *Information Technology I and II*

**Warren County Career Center**

**3525 North State Route 48  
Lebanon, Ohio 45036**

**Adopted 06/29/2009**

*This document is for the use of the staff at Warren County Career Center.  
Credit is given the designer of the template, Upper Valley JVS, Piqua, Ohio.*

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# *Acknowledgements*

## **Information Technology Warren County Career Center**

We would like to take this opportunity to express our gratitude to the following people for their guidance and support in the preparation of this course of study:

Warren County Career Center Administrative Team  
Warren County Educational Service Center  
Mr. Reggie Holtrey  
Mr. Ken Wagner  
Mr. Bob Morgan  
Mr. Tom Brinkmann

***Warren County Career Center  
Resolution Of School Board Approval***

WHEREAS, representatives of Information Technology Program of the Warren County Career Center have reviewed the English Application in Drama Course of Study; and

WHEREAS, this Course of Study is based upon Integrating Technical and Academic Competencies adopted by the State of Ohio for the Information Technology (IT) program; and

WHEREAS, the Information Technology Program have reviewed and added competencies as needed to address local labor market needs and trends in the industry;

NOW, THEREFORE, BE IT RESOLVED, in accordance with the Superintendent's recommendation, that the Warren County Career Center adopt the Information Technology I and II Course of Study.

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District Superintendent

Date

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President, Board of Education

Date

## *Statement of Recommendation*

The Information Technology Program at Warren County Career Center has reviewed this course of study and recommends it for use as the foundation for instruction in the Information Technology class.

The developers of this course of study have considered local labor market needs and the school's ability to offer specialized programs. The competencies have been reviewed and accepted as being congruent with our school's vision, mission, and strategic goals. When appropriate, additional competencies related to the program area have been incorporated into this course of study.

Achievement of technical competencies, utilizing proper attitudes, and demonstrating appropriate values are critical for successful employment and for furthering educational opportunities within a student's chosen field. We believe that this course of study adequately and correctly focuses upon student development.

This course of study is recommended on: 06/29/2009

## ***Warren County Career Center Vision Statement***

WCCC is the valued partner of choice within the educational and economic systems of our communities, by providing quality academic and career technical education.

We pave the way for a future of opportunities unique to each of our learners.

## ***Warren County Career Center Mission Statement***

To prepare youths and adults to make informed career choices and to successfully enter, compete, and advance in a changing work world.

## ***Warren County Career Values***

- Treating each other with respect, dignity, trust and mutual value
- Communicating openly and honestly
- Taking ownership of personal actions and being held accountable for results
- Upholding and demonstrating high ethical, educational and fiscal standards
- Exhibiting high levels of professionalism
- Providing high quality instruction and highly qualified staff to ensure success for all learners
- Making quality customer service a high priority
- Promoting partnerships and a team environment
- Celebrating team and individual achievements
- Using data to drive planning, decision making and actions
- Embracing educational opportunities for change and diversity

## *Course Design*

Courses are designed to reflect career-focused education, which combines high-level academics with real-life technical skills. The intent is to maximize a student's present and future academic and career success.

Career-focused education enhances the integration of academic and technical skills, designs programs that prepare students with transferable skills and promotes each student's career opportunities.

## *Course Philosophy*

We believe that this curriculum guide will provide the instructor with curriculum objectives for Information Technology (IT). During the junior year of the program, Level I and Level II will be very similar due to the fact that all students will enter the program with comparable skills and knowledge. IT II will be developed as the first year progresses in preparation for those students who will be taking Level II at the beginning of their second year.

The course will enable the student to receive all instruction necessary to successfully complete various computer networking certifications and give the students the groundwork to enable them to receive the skills needed for careers in the computer networking industry.

The instruction will include a mix of on-line and in-class performance tools to measure the competency of the students for their career goals. The instruction will consist of individual and group projects, hands-on and instruction-based learning tools, both inside and outside the classroom as opportunities present themselves.

Resources in the larger community will be called upon to provide the students with opportunities to interact with others and to learn the importance of meeting needs where and when they arise so the students become adept at customer service and satisfaction.

Evaluation of student success will consist of both formal and informal tools. Specific and comprehensive testing methods will be used to determine instruction based competency and observation and interview will determine competency regarding project and hands-on learning capabilities.

## ***Course Goals***

The course goals for Information Technology:

The goal for the first year of Information Technology is to establish solid learning objectives for all students to be successful in the field. It is fully realized that the program will evolve with the professional input of the instructor and the changing nature of technology.

The students will begin receiving an introduction to the concepts needed to successfully complete certification in Comp TIA A+ testing. The CompTIA A+ certification confirms a technician's ability to perform responsibilities such as installation, configuration, diagnosing, preventive maintenance and basic networking.

They will also begin receiving instruction related to areas of competency surrounding the Information Technology career field. The requirements include software and programming concepts that are an integral part of a computer professionals' job description.

The introduction of new technologies and leading edge career requirements will necessitate the instructors continuing the process of improving their knowledge base as they keep abreast of any changes that need to be instituted in their classroom offerings to meet the future demands of an IT career professional.

The instructors will also keep involved with their advisory committee members to insure they are providing opportunities and instruction that meet the needs of the larger community.

## ***Course Description***

Information Technology is a Career/Technical Program. It combines academic rigor with technical training. The Tech Prep concept includes two years of high school training, two years of technical college training, and two years of university training to earn a Bachelor's degree. Students benefit by building a career portfolio and gaining experience through internships and training while completing a Bachelor's degree in the same four years as non-Tech Prep students.

Students successfully completing the three year Information Technology Tech Prep program can earn up to 26 articulated college credits from Sinclair. Qualifying students choosing to attend Sinclair earn a guaranteed \$3,000 scholarship through the Miami Valley Tech Prep Consortium. (<http://www.mvtechprep.org>)

### **Typical Class**

45 minutes – 2 hour      Students will research the topic in the classroom with teacher instruction or assistance.

10- 80 minutes            Students will be able to apply skills learned in the Information Technology Program.

Internships will be offered to students at local businesses, when available.

## *Academic and Technical Integration*

Expectations of curriculum must be aligned with what is written, taught, assessed, and reported. Student expectations focus on active, project-centered learning—an approach to learning that emphasizes a connection between ideas in a discipline and the outside world. Educational programming and course content will clearly connect career and post-secondary opportunities. At the Warren County Career Center, the main goal is to design courses and projects that use strategies for authentic instruction. These characteristics of instruction focus on deep understanding, established opportunities for concept connections, provide anticipatory and abstract thinking, and emphasize genuine application.

The academic courses at the WCCC follow the state model curricula. They are designed to meet both associate school and state requirements. These standards respond to the need to improve student achievement, quality of curriculum and instruction, and strengthen school and community relationships.

## *Technology*

The Warren County Career Center board and staff believe that technology skills are essential for all students to achieve in the 21<sup>st</sup> century. It is the goal of this district to infuse technology into all facets of education:

- Instruction
- Assessment
- Administration
- Career planning
- Course design
- Professional development

Strategies to incorporate technology into all facets of education are a priority of the district and there is commitment to a continual process to provide updated hardware, software, and professional development for staff members for the purpose of providing a high quality education, with the integration of technology, for all students.

## *Job Shadowing*

Job Shadowing is designed to give the student a short-term overview of the many opportunities within a career field. Career-technical instructors confer with students to determine appropriate experiences.

Internships and Job Placement vary somewhat, but during each experience students should accomplish the following goals:

1. Work with mentors, supervisors, co-workers, and others to accomplish assigned tasks that contribute to the long- and short-term goals of the student. All aspects of the internship/placement (including dates, times, responsibilities, evaluations, etc.) will be outlined in an approved Internship Learning Plan that is coordinated by the career-technical instructor.
2. Apply basic skills and knowledge to "real world" business settings and learn new skills that are relevant to the career path.
3. Demonstrate a solid understanding of the basic skills outlined in the Internship Learning Plan.
4. Reflect upon the internship/placement/job shadowing in terms of post-secondary education/career options.

The criterion for participation in career-based learning experiences is included in the approved packet for each activity and may be obtained by the instructor from the Career Pathways office.

The specifics of how these opportunities are offered in this career-technical program or statement of academic support are:

Students that meet the requirements set forth by the Early Placement Committee are eligible to work with local businesses during the second semester of their senior year. This allows the student to work during designated lab time with the approval of the Instructor. The Instructor will monitor academic eligibility along with the status of their field progress using contractor evaluations. In addition, parent approval and a written contract with the student for certain goals to be achieved will be required.

## *Students Served*

The population served by this program is juniors and seniors.

Differentiated teaching strategies are implemented where necessary for students with learning and behavior disabilities; however program outcomes are comparable to student specific abilities with the goal for all learners to find an information technology career path that meets their unique skill sets.

# *Scope and Sequence*

**UNIT TITLE:** COMPTIA A+ CERTIFICATION

**Benchmark A: Students will develop an understanding of personal computer components and how they function.**

**Indicators:**

- Identify the fundamental principles of using personal computers (e.g. software, hardware)
- Install, configure, optimize and upgrade personal computer components (e.g. RAM, expansion cards, CPU)
- Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components
- Perform preventative maintenance on personal computer components

**Benchmark B: Students will learn the components and functionality of laptops and portable devices**

**Indicators:**

- Identify the fundamental principles of using laptops and portable devices
- Install, configure, optimize and upgrade laptops and portable devices (e.g. RAM, Hard Drive, CD/DVD drives, PCMCIA)
- Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices
- Perform preventative maintenance on laptops and portable devices

**Benchmark C: Students will install and configure different operating systems to understand basic functionality**

**Indicators:**

- Identify the fundamentals of using operating systems (e.g. GUI, CLI, filing systems)
- Install, configure, optimize and upgrade operating systems (Windows, Linux, Server Operating Systems)
- Identify tools, diagnostic procedures and troubleshooting techniques for operating systems
- Perform preventative maintenance on operating systems

**Benchmark D: Students will develop an understanding of Printers and Scanners**

**Indicators:**

- Identify the fundamental principles of using printers and scanners
- Identify basic concepts of installing, configuring, optimizing and upgrading printers and scanners
- Identify tools, basic diagnostic procedures and troubleshooting techniques for printers and scanners

**Benchmark E: Students will demonstrate knowledge of computer networks.**

**Indicators:**

- Identify the fundamental principles of networks
- Install, configure, optimize and upgrade networks
- Identify tools, diagnostic procedures and troubleshooting techniques for printers and scanners

**Benchmark F: Students will demonstrate knowledge of computer and network security**

**Indicators:**

- Identify the fundamental principles of security
- Install, configure, upgrade and optimize security
- Identify tool, diagnostic procedures and troubleshooting techniques for security
- Perform preventative maintenance for computer security

**Benchmark G: Students will understand safety and environmental issues when dealing with computer hardware.**

**Indicators:**

- Describe the aspects and importance of safety and environmental issues
- Identify potential hazards and implement proper safety procedures including ESD precautions and procedures safe work environment and equipment handling
- Identify proper disposal procedures for batteries, display devices and chemical solvents and cans

**Benchmark H: Students will understand the importance of professionalism and good communication skills in the IT field**

**Indicators:**

- Use good communication skills including listening and tact/discretion, when communication with customers and colleagues
- Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

**UNIT TITLE: NETWORK+ CERTIFICATION**

**Benchmark A: Students will develop an understanding of networking media and topologies**

**Indicators:**

- Recognize logical and physical network topologies (e.g. Star, Bus, Mesh, Ring)
- Understand the main features of the IEEE 802 standards (e.g. 802.2-LLC, 802.3-Ethernet, 802.5-Token Ring, 802.11-Wireless, FDDI, networking topologies including: CSMA/CD, CSMA/CA)

- Recognize and learn the characteristics of different cable standards (e.g. 10BASE-T, 10BASE-FL, 100BASE-TX and 100BASE-FX, 1000BASE-T, 1000BASE-CX, 1000BASE-SX and 1000BASE-LX, 10 GBASE-SR, 10 GBASE-LR and 10 GBASE-ER)
- Recognize and learn how to terminate different media connectors (e.g. RJ-11, RJ-45, F-Type, ST, SC, IEEE 1394, Fiber LC, MT-RJ, USB)
- Identify the purposes, features, and functions of networking components/devices (e.g. Hubs, Repeaters, Bridges, Switches, Routers, NICs, MAUs, CSU/DSU, ISDN adapters, Modems, Transceivers)
- Specify the different characteristics of the IEEE 802.11 wireless technologies

**Benchmark B: Students will develop an understanding of networking protocols and standards**

**Indicators:**

- Identify a MAC address and its components
- Understand the seven layers of the OSI model and each layers functions
- Identify which layer of the OSI model different networking components operate in
- Define different routed networking protocols such as: IPX/SPX, NetBEUI, Appletalk, IP
- Identify the components and structure of IP addresses (IPv4 and IPv6)
- Identify classful IP ranges and their default subnet masks (e.g. Class A, B, C)
- Demonstrate subnetting according to logical addressing needs.
- Define the function, purposes, and use of the following protocols: TCP/IP, TCP, UDP, FTP, HTTP, TFTP, POP3, SMTP, IMAP, Telnet, SSH, ICMP, SFTP, ARP, RARP, NTP, NNTP, LDAP, SCP, IGMP, and LPR
- Identify port numbers (well-known) and what protocol they are associated with. (e.g. 20 and 21-FTP, 22-SSH, 23-Telnet, 25-SMTP, 53-DNS, 69-TFTP, 80-HTTP, 110-POP3, 123-NTP, 143-IMP4, 443-HTTPS)
- Identify the purpose of protocols and networking services (e.g. DNS, NAT, ICS, WINS, SNMP, NFS, SMB, AFP, LPD)
- Identify the characteristics of different Internet access technologies (e.g. xDSL, Broadband cable, POTS/PSTN, Satellite, Wireless)
- Identify the different characteristics of remote access protocols (e.g. RAS, PPP, SLIP, PPPoE, PPTP, VPN, RDP)
- Identify the different security protocols and describe their function (e.g. IPsec, L2TP, SSL, WPA, WEP)
- Identify the different authentication protocols (e.g. RADIUS, MS-CHAP, CHAP, PAP, Kerberos and EAP)

**Benchmark C: Students will develop an understanding of different network implementations.**

**Indicators:**

- Identify the functionality of different server operating systems to access network resources (e.g. Windows, Netware, UNIX/Linux/Mac OS X)

- Identify the different capabilities needed for client workstations to connect to and use network resources (e.g. network protocols, services, media)
- Identify the appropriate tool needed when given a wiring task (e.g. punch down tool, tone generator, wire crimper, media tester)
- Identify the characteristics and benefits of using a firewall
- Identify the characteristics and benefits of using a proxy service
- Identify the characteristics of VLANs
- Identify the characteristics of extranets and intranets
- Identify the purpose of using and characteristics of antivirus software
- Identify the purpose of fault tolerance (e.g. power, link redundancy, storage, services)
- Describe the characteristics of disaster recovery (e.g. backup, restore, offsite storage, hot and cold spares, hot-warm-cold sites)

**Benchmark D: Students will develop an understanding of network support and troubleshooting**

**Indicators:**

- Given a troubleshooting scenario, choose the appropriate network utility to figure out what the problem is (e.g. tracert/traceroute, ping, netstat, arp, ipconfig, ifconfig, winipcfg, nslookup)
- Given a network scenario, interpret the visual indicators given to determine what the problem could be (e.g. LED)
- Given a troubleshooting scenario involving a client accessing remote services, identify the possible cause of the problem
- Given a scenario, determine the result of modifying, adding, or removing network services
- Given a network troubleshooting scenario involving an infrastructure issue, identify the cause of the problem (e.g. bad media, interference, network hardware)
- Given a network problem scenario, select a suitable course of action based on a logical troubleshooting strategy

**UNIT TITLE: INFORMATION TECHNOLOGY BASICS**

**Benchmark A: Demonstrate basic knowledge of information technology history**

**Indicators:**

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

**Benchmark B: Demonstrate basic knowledge of the information technology impact on society.**

**Indicators:**

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

**Benchmark C: Demonstrate knowledge of information technology basics****Indicators**

- Identify classifications of computing platforms
- Identify the elements of the information processing cycle (i.e., input, process, output, and storage)
- Identify major hardware components and their functions
- Identify types of computer storage devices
- Identify types of processing (e.g., batch, interactive, event-driven)
- Identify major operating system fundamentals and components
- Identify the role of the binary system in information technology
- Explain the role of number systems and internal data representation in information technology
- Access needed information using company and manufacturers' references (e.g., procedural manuals, documentation, standards, work flowcharts, Internet/Intranet resources)
- Discuss the need for asset management (e.g., hardware, software licensing)
- Differentiate between asset tracking and asset management

**Benchmark D: Demonstrate knowledge of software associated with information technology.****Indicators:**

- Describe the key functions of systems software
- Classify widely used software applications (e.g., word processing, database)

- management, spreadsheet development)
- Describe the range of languages used in software development
- Explain relationship between data and software development (e.g., basic data structures, XML, relational databases)
- Identify new and emerging classes of software
- Explain intellectual property (e.g., software, images, open-source, documentation)
- Explain the historical difference between packaged software and custom/in house developed software

**Benchmark E: Demonstrate knowledge of software associated with information Technology**

**Indicators:**

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

**Benchmark F: Explore the future of information technologies**

**Indicators:**

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

**Benchmark G: Create documents using word processing software**

**Indicators:**

- Create documents and tables
- Format text using basic and advanced formatting functions
- Locate/replace text using search and replace functions
- Create new forms, style sheets, and templates
- Employ word processing utility tools (e.g., spell checker, grammar checker, and thesaurus)
- Create tables, columns, outlines, footnotes and endnotes
- Create and run macros
- Assemble documents using merge functions (e.g., merge address files with letters)

- and envelopes)
- Print materials using print functions
- Edit documents (i.e., version control)
- Access needed information using word processing help screens

### **Benchmark H: Create relational databases**

#### **Indicators:**

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

### **Benchmark I: Create spreadsheets**

#### **Indicators:**

- Design a spreadsheet in accordance with written and/or oral specifications
- Retrieve existing spreadsheets
- Format spreadsheets using basic formatting functions (e.g., page setup)
- Perform calculations using simple formulas
- Edit spreadsheets (i.e., delete, move, and copy within spreadsheets)
- Create charts and graphs from spreadsheets
- Group worksheets
- Input/process data using spreadsheet functions
- Improve spreadsheet display using enhancement features
- Protect data using spreadsheet protection features
- Run macros
- Troubleshoot spreadsheet problems
- Resolve function errors as needed
- Apply advanced spreadsheet formulas
- Create spreadsheet solutions to business problems

- Make "*what if*" business decisions using spreadsheets as a tool
- Save and print spreadsheets
- Access needed information using online help features

### **Benchmark J: Create presentations using presentation graphics**

#### **Indicators:**

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

### **Benchmark K: Apply computer office tools**

#### **Indicators:**

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

### **Benchmark L: Demonstrate knowledge of basic data communications components and Trends**

#### **Indicators:**

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

## **Benchmark M: Evaluate and access information using electronic sources**

### **Indicators:**

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

## **Benchmark N: Install/configure software programs**

### **Indicators:**

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

## **Benchmark O: Demonstrate basic knowledge of the Internet**

### **Indicators:**

- Identify the key characteristics of the Internet
- Discuss the ownership/administration of the Internet
- Trace the development of Internet technology
- Identify current issues related to the Internet
- Identify services and tools offered on the Internet
- Identify the specific strengths, weaknesses, and special features of available search engines
- Explain bookmarks and their functions

- Explain accepted Internet etiquette (i.e., netiquette)
- Identify current uses and applications of the Internet

### **Benchmark P: Access the Internet**

#### **Indicators:**

- Connect to the Internet
- Test Internet connection
- Identify the components of Internet software
- Install Internet software
- Explore browser features
- Download software upgrades from the Internet
- Unpack files using compression software
- Demonstrate acute awareness of virus protection techniques
- Install/update firewalls and malware protection
- List uses of mobile devices to access the Internet

### **Benchmark Q: Utilize Internet services**

#### **Indicators:**

- Access business and technical information using the Internet
- Select search engine(s) to use
- Select appropriate search procedures and approaches
- Locate information using search engine(s) and Boolean logic
- Navigate Web sites using software functions (e.g., forward, back, go to, bookmarks)
- Evaluate Internet resources (e.g., accuracy of information)
- Access library catalogs on the Internet
- Access commercial, government, and education resources
- Bookmark Web addresses (URLs)
- Download files from FTP archives
- Communicate via e-mail using the Internet
- Subscribe to mailing lists
- Recognize the value of special interest groups and forums (e.g., blogs)
- Retrieve online tools
- Download/convert Internet programming files
- Install/configure Web browser
- Explore the multimedia capabilities of the World Wide Web
- Evaluate plug-ins and helpers to the Web browser
- Explore collaboration tools
- Participate in online audio and video conferencing
- Archive files
- Compile a collection of business sites (e.g., finance and investment)
- Explore electronic commerce

### **Benchmark R: Demonstrate knowledge of Web page basics**





## **Benchmark B: Explain basic Web programming**

### **Indicators:**

- Identify the purpose of Web content delivery enablers (e.g., CGI, API, SSI)
- Discuss client-side processing and its advantages/disadvantages
- Identify standard scripting languages (e.g., JavaScript, Visual Basic Script, Action Scripting)
- Discuss the uses and advantages/disadvantages of various scripting languages
- Explain how to use a scripting language to program a site
- Identify Internet protocol governing bodies
- Explain how to use Internet communication protocols

## **Benchmark C: Apply knowledge of Web hosting**

### **Indicators:**

- Compare the advantages and disadvantages of running one's own server vs. using a server provider
- Identify hardware requirements for a server
- Identify server software options
- Demonstrate the process of ordering a domain name
- Evaluate hosting providers
- Explain how to assign a domain name to a DNS server
- Comply with TCP/IP (Transfer Control Protocol/Internet Protocol)
- Upload files to the server
- Publicize the site (e.g., optimize search engine placement)
- Collect/analyze usage statistics

**UNIT TITLE: BUSINESS PROCESSES FOR IT PROFESSIONALS**

## **Benchmark A: Students will demonstrate knowledge of project planning methodology**

### **Indicators:**

- Define terms associated with project planning
- Identify steps associated with project planning
- Identify methodologies associated with project planning
- Define the project's contribution to business needs
- Identify stakeholders and decision makers
- Define the scope of the project
- Evaluate project requirements
- Develop task list (e.g., work breakdown structures)
- Prioritize tasks according to business needs
- Identify required resources and budget
- Develop initial project management flowchart
- Identify critical milestones
- Evaluate risks
- Prepare contingency plan

- Develop a method of evaluation
- Explain alternative development methodologies

**Benchmark B: Conduct requirements analysis**

**Indicators:**

- Identify business needs/expectations
- Analyze use of product or system
- Specify functional requirements
- Specify data requirements
- Describe how processes and data support business expectations
- Develop test criteria and plans
- Revise documentation prepared in initiation/planning phase as needed
- Generate task status report
- Track critical milestones
- Participate in project phase review
- Report project status

**Benchmark C: Demonstrate knowledge of the requirements analysis phase**

**Indicators:**

- Identify business expectations
- Explain how implementation will impact the environment
- Explain budget and time restraints
- Explain how the business environment impacts requirements
- Explain how internal and external forces impact project requirements
- Explain how legal and regulatory issues impact project requirements

**Benchmark D: Identify current technical environment**

**Indicators:**

- Identify current internal and external technical resources
- Identify current internal and external technology
- Identify internal and external processes

**Benchmark E: Demonstrate knowledge of design alternatives and options**

**Indicators:**

- Determine return on investment (ROI) [e.g., cost-benefit analysis]
- Explain Total Cost of Ownership (TCO)
- Define risks and rewards for each option
- Explain the components of “build versus buy”
- Explain processes to compare design versus requirements

**Benchmark F: Demonstrate knowledge of how systems and products are developed**

**Indicators:**

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

**Benchmark G: Discuss solutions versus requirements****Indicators:**

- Explain how unit testing is used to validate requirements
- Explain the purpose of technical review
- Explain the purpose of end-user solution review

**Benchmark H: Explain quality assurance processes****Indicators:**

- Discuss the historical evolution of quality assurance initiatives
- Interpret quality management terminology
- Identify the role of quality within the organization
- Identify the features and benefits of quality planning
- Discuss the relationship among organizational structures, policies, procedures and quality assurance
- Identify successful efforts by industry to improve quality and/or reduce costs
- Differentiate between prevention and detection
- Differentiate between variable and attribute data
- Identify types of control charts
- Explain how statistical techniques are used to control quality

**Benchmark I: Demonstrate knowledge of the testing environment****Indicators:**

- Identify the purpose of integration testing
- Identify the purpose of system testing
- Identify the purpose of security testing
- Identify the purpose of acceptance testing

**Benchmark J: Describe key components of an implementation plan (e.g., communication, business continuity plan)****Indicators:**

- Identify turn-back points (e.g., go or no-go)

- Identify new work processes and procedures
- Identify steps all business units must take to implement
- Identify decision criteria for retiring old solution (i.e., displaced technology)

**Benchmark K: Explain the value a communication plan can provide to Implementation**

**Indicators:**

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

**Benchmark L: Explain the value a training plan can provide to implementation**

**Indicators:**

- Identify components of training plan
- Identify common training methodologies (e.g., computer-based, hands on)
- Identify strengths and weaknesses of each methodology
- Identify functions of a training plan

**Benchmark M: Explain how business continuity plans (e.g., disaster recovery, rollback) interrelate with implementation plans**

**Indicators:**

- Describe purpose and components of a roll-back plan (e.g., go-no-go)
- Describe purpose and components of a fall-back plan (e.g., disaster recovery plan)
- Describe purpose and components of a business continuity plan

**Benchmark N: Demonstrate knowledge of information technology operations and Maintenance**

**Indicators:**

- Describe maintenance and operations phase
- Identify systems operations
- Define problem and modification process
- Define steps to maintain system

**Benchmark O: Explain the role of maintenance as part of the IT function**

**Indicators:**

- Define components of maintenance contracts
- Define upgrade process
- Define Service Level Agreements (SLAs)

**Benchmark P: Define components of incidence and problem management**

**Indicators:**

- Define escalation process
- Explain different methodologies for event notification (e.g., paging, e-mail)
- Explain support contract

**Benchmark Q: Identify components of change management process**

**Indicators:**

- Define the change and value of change
- Define when to do change
- Explain what change entails
- Explain the impact of change
- Contact all affected parties
- Identify back-up plan

**UNIT TITLE: BUSINESS LAW AND LEGAL ISSUES**

**Benchmark A: Define intellectual property rights covered by intellectual law**

**Indicators:**

- Distinguish among the various forms of intellectual property rights (e.g., copyright, patent, trademark, trade secrets)
- Define plagiarism
- Define authorship Define work made for hire
- Define fair use
- Differentiate the rights granted under copyright, patent, and trademark
- Identify the rights related to electronic imagery
- Discuss consequences of violation of copyright trademark and patent law
- Identify the liability for invasion of privacy
- Identify the liability for slander and libel Identify legal terms related to IT
- Discuss licensing issues
- Discuss confidentiality issues and their liability implications

**Benchmark B: Describe the components of contracts**

**Indicators:**

- Define statement of work
- Define duration
- Define liabilities
- Define termination clause Define service level agreements
- Define exclusions
- Define warranties
- Explain dispute resolution
- Define terms and conditions



**Indicators:**

- Identify desired group and team behavior in an IT context
- Explain the importance of cross-functional teams in the IT environment
- Define roles/responsibilities within the group decision making process
- Identify ways to assess team productivity and results

**Benchmark E: Explain the importance of professional behavior in the IT environment**

**Indicators:**

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

**UNIT TITLE: BASIC BUSINESS CONCEPTS**

**Benchmark A: Explain business ownership**

**Indicators:**

- Define types of business ownership (e.g., sole proprietorship, partnership)
- Explain the advantages and disadvantages of the different forms of business ownership
- Identify variations in ownership forms
- Explain how business organization ownership can evolve over time

**Benchmark B: Explain basic business organization and structure**

**Indicators:**

- Differentiate between divisional and departmental structures (e.g., customer, geographic and product)
- Identify types of organizational structures (e.g., organic, matrix, mechanistic)
- Explain how internal and external forces impact the requirements for tech or service implementation (e.g., size, complexity, profitability)

**Benchmark C: Discuss the role of IT in meeting business strategic objectives**

**Indicators:**

- Identify common sources outlining strategic business objectives
- Define typical business objectives

- Identify ways in which business objectives are measured (e.g., key performance indicators)
- Identify business stakeholders (e.g., shareholders, customers, suppliers)
- Discuss how IT functions impact business objectives
- Discuss obstacles in measuring the impact of IT functions on business objectives

**Benchmark D: Discuss the role of IT in meeting business strategic objectives**

**Indicators:**

- Identify common sources outlining strategic business objectives
- Define typical business objectives
- Identify ways in which business objectives are measured (e.g., key performance indicators)
- Identify business stakeholders (e.g., shareholders, customers, suppliers)
- Discuss how IT functions impact business objectives
- Discuss obstacles in measuring the impact of IT functions on business objectives

**Benchmark E: Explain how IT functions interface with other business functions**

**Indicators:**

- Explain the role of IT in the business organization
- Explain how IT interfaces with the human resource function
- Explain how IT interfaces with the finance and accounting functions
- Explain how IT interfaces with the production/manufacturing functions
- Explain how IT interfaces with the sales, marketing, and distribution functions

**Benchmark F: Demonstrate knowledge of cost-benefit analysis**

**Indicators:**

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

**UNIT TITLE:            TECHNICAL WRITING AND DOCUMENTATION**

**Benchmark A: Evaluate technical writing requirements**

**Indicators:**

- Define/prioritize communication needs
- Resolve conflicting requirements
- Specify project objectives
- Determine the size and specifics of the work to be completed
- Estimate time, materials, and capabilities needed to complete assignment
- Identify criteria for successful completion of project
- Evaluate strengths and weaknesses of completed project

### **Benchmark B: Write technical reports**

#### **Indicators:**

- Determine audience
- Access needed information using standard references and sources
- Identify type of report needed
- Compile relevant data
- Organize data into charts and graphs
- Analyze data
- Draw conclusions from data analysis
- Outline report
- Draft report
- Edit report (e.g., check spelling, grammar, punctuation, sentence structure, accuracy of content)
- Review report with peers

### **Benchmark C: Conduct technical research**

#### **Indicators:**

- Identify target audience
- Define research questions
- Determine priorities for the information that should be gathered
- Identify potential sources of information
- Target audience/user group as a key information source
- Identify subject matter experts
- Evaluate potential sources of information based on established criteria (e.g., affordability, relevance)
- Conduct interviews with selected human information sources
- Gather information from selected print and electronic sources
- Determine the accuracy and completeness of the information gathered

### **Benchmark D: Design technical documentation**

#### **Indicators:**

- Define purpose of documentation
- Specify standards for documentation, including critical success criteria
- Identify delivery options Evaluate cost-effectiveness of each delivery option
- Select tools appropriate for task purpose

- Plan information flow
- Select writing style and tone appropriate for given documentation
- Determine level of detail needed
- Identify visuals appropriate for given documentation
- Provide feedback on design to development team/individual

# *Technology Standards*

## **Standard 1: Nature of Technology**

**Students develop an understanding of technology, its characteristics, scope, core concepts\* and relationships between technologies and other fields.**

Benchmark A: Synthesize information, evaluate and make decisions about technologies.

Benchmark B: Apply technological knowledge in decision-making.

Benchmark C: Examine the synergy between and among technologies and other fields of study when solving technological problems.

## **Standard 2: Technology and Society Interaction**

**Students recognize interactions among society, the environment and technology, and understand technology's relationship with history. Consideration of these concepts forms a foundation for engaging in responsible and ethical use of technology.**

Benchmark A: Interpret and practice responsible citizenship relative to technology.

Benchmark B: Demonstrate the relationship among people, technology and the environment.

Benchmark C: Interpret and evaluate the influence of technology throughout history, and predict its impact on the future.

Benchmark D: Analyze ethical and legal technology issues and formulate solutions and strategies that foster responsible technology usage.

Benchmark E: Forecast the impact of technological products and systems.

## **Standard 3: Technology for Productivity Applications**

**Students learn the operations of technology through the usage of technology and productivity tools.**

Benchmark A: Integrate conceptual knowledge of technology systems in determining practical applications for learning and technical problem-solving.

Benchmark B: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

#### **Standard 4: Technology and Communication Applications**

**Students use an array of technologies and apply design concepts to communicate with multiple audiences, acquire and disseminate information and enhance learning.**

Benchmark A: Apply appropriate communication design principles in published and presented projects.

Benchmark B: Create, publish and present information, utilizing formats appropriate to the content and audience.

Benchmark C: Identify communication needs, select appropriate communication tools and design collaborative interactive projects and activities to communicate with others, incorporating emerging technologies.

#### **Standard 5: Technology and Information Literacy**

**Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.**

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

Benchmark B: Apply a research process model to conduct research and meet information needs.

Benchmark C: Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

Benchmark D: Evaluate choices of electronic resources and determine their strengths and limitations.

#### **Standard 6: Design**

**Students apply a number of problem-solving strategies demonstrating the nature of design, the role of engineering and the role of assessment.**

Benchmark A: Identify and produce a product or system using a design process, evaluate the final solution and communicate the findings.

Benchmark B: Recognize the role of teamwork in engineering design and of prototyping in the design process.

Benchmark C: Understand and apply research, development and experimentation to problem-solving.

## **Standard 7: Designed World**

**Students understand how the physical, informational and bio-related technological systems of the designed world are brought about by the design process. Critical to this will be students' understanding of their role in the designed world: its processes, products, standards, services, history, future, issues and career connections.**

Benchmark A: Classify, demonstrate, examine, and appraise energy and power technologies.

Benchmark B: Classify, demonstrate, examine and appraise transportation technologies.

Benchmark C: Classify, demonstrate, examine and appraise manufacturing technologies.

Benchmark D: Classify, demonstrate, examine and appraise construction technologies.

Benchmark E: Classify, demonstrate, examine and appraise information and communication technologies

Benchmark F: Classify, demonstrate, examine and appraise medical technologies.

Benchmark G: Classify, demonstrate, examine and appraise agricultural and related biotechnologies.

# *Performance Measures/Student Assessment/Instructional Strategies*

## **Assessments/Evaluations**

- Observations
- Demonstrations
- Portfolios
- Standardized Tests
- Class Assignment
- Quizzes/Tests/Exams
- Web Exam/Certification

## **Instructional Strategies**

- Teacher-Directed & Student-Centered Activities
- Case Study Problem Solving
- Cooperative Learning
- Project-Based Learning
- Career-Based Learning (Internships/Shadowing/Placement)
- Community-Based Learning (CTSOs and Other)
- Exploratory Learning
- Independent Research
- Team Teaching

## **Content Specific Strategies**