

IT FUNDAMENTALS
COURSE CODE: 5025

COURSE DESCRIPTION: The IT Fundamentals course is designed to prepare the student to take the CompTIA IT Fundamentals (ITF+ Exam FC0-U61) certification exam. Instruction includes IT concepts and terminology, infrastructure, applications and software, software development Concepts, Database Fundamentals, Security, emerging technologies, computational thinking, and career development. Students utilize the skills and qualities of the S.C. Profile of the Graduate to analyze and solve problems within the IT industry.

OBJECTIVE: Given the necessary equipment, supplies, and facilities, the student will complete all of the following core standards successfully.

COURSE CREDIT: 1 (120 hours) Carnegie unit

PREREQUISITE: None

RECOMMENDED GRADE LEVELS: 9, 10, 11

A. SAFETY AND ETHICS

Proficient professionals know the academic subject matter, including safety and ethics. The following accountability criteria are considered essential for students in any program of study.

1. Identify major causes of work-related accidents in offices.
2. Demonstrate appropriate ergonomic practices.
3. Describe the threats to a computer network, methods of avoiding attacks, and options in dealing with virus attacks.
4. Identify potential abuse and unethical uses of computers and networks.
5. Explain the consequences of illegal, social, and unethical uses of information technologies (e.g., piracy; illegal downloading; licensing infringement; and inappropriate uses of software, hardware, and mobile devices).
6. Differentiate between freeware, shareware, and public domain software copyrights.
7. Discuss computer crimes, terms of use, and legal issues such as copyright laws, fair use laws, and ethics pertaining to scanned and downloaded clip art images, Creative Commons, photographs, documents, video, recorded sounds and music, trademarks, and other elements for use in Web publications.
8. Identify netiquette including the use of email, social networking, blogs, texting, and chatting.
9. Describe ethical and legal practices in business professions such as safeguarding the confidentiality of business-related information.

10. Discuss the importance of cyber safety and the impact of cyber bullying.

B. STUDENT ORGANIZATIONS

Proficient professionals know the academic subject matter, including professional development. The following accountability criteria are considered essential for students in any program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

C. TECHNOLOGY KNOWLEDGE

Proficient professionals know the academic subject matter, including the ethical use of technology. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation.
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., piracy; cyberbullying, illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, Creative Commons, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, and other elements for personal and professional use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.

D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Proficient professionals know the academic subject matter, including positive work practices and interpersonal skills. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate creativity and innovation.
2. Demonstrate critical thinking and problem-solving skills.
3. Demonstrate initiative and self-direction.
4. Demonstrate integrity.
5. Demonstrate work ethic.
6. Demonstrate conflict resolution skills.
7. Demonstrate listening and speaking skills.
8. Demonstrate respect for diversity.
9. Demonstrate customer service orientation.
10. Demonstrate teamwork.

E. PROFESSIONAL KNOWLEDGE

Proficient professionals know the academic subject matter, including positive work practices and interpersonal skills. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate global or “big picture” thinking.
2. Demonstrate career and life management skills and goal-making.
3. Demonstrate continuous learning and adaptability skills to changing job requirements.
4. Demonstrate time and resource management skills.
5. Demonstrates information literacy skills.
6. Demonstrates information security skills.
7. Demonstrates information technology skills.
8. Demonstrates knowledge and use of job-specific tools and technologies.
9. Demonstrate job-specific mathematics skills.
10. Demonstrates professionalism in the workplace.
11. Demonstrate reading and writing skills.
12. Demonstrates workplace safety.

F. IT CONCEPTS AND TERMINOLOGY

IT professionals demonstrate knowledge and skills in identifying and explaining the basics of IT concepts and terminology. The following accountability criteria are considered essential for students in IT programs of study.

1. Compare and contrast notational systems (e.g., binary, hexadecimal, ASCII, unicode).
2. Compare and contrast fundamental data types and their characteristics.
3. Illustrate the basics of computing and processing.
4. Explain the value of data and information.

5. Compare and contrast common units of measure (e.g., bit/byte, KB, MB, GB).
6. Explain the troubleshooting methodology.

G. INFRASTRUCTURE

IT professionals demonstrate knowledge and skills in identifying and explaining the basics for setup and installation of peripheral and network devices. The following accountability criteria are considered essential for students in IT programs of study.

1. Classify common types of input/output device interfaces (e.g., networking, peripheral device, graphic device).
2. Design efficient device placement to create optimum airflow, humidity, temperature, and dust accumulation.
3. Differentiate various computer connector/ports, (e.g., video, eSATA, thunderbolt, USB, HDMI, ethernet, RJ-45, RJ-11, audio, and power).
4. Set up and install peripheral devices to a laptop or PC.
5. Identify the primary causes of electrostatic discharge and ways to mitigate the effects of ESD on electronic devices.
6. Identify situations where various power peripherals should be used (e.g., UPS, surge protector, power strip).
7. Explain the purpose of common internal computing components (e.g., motherboard/system board, RAM, CPU, storage, NIC).
8. Compare and contrast common Internet service types (e.g., fiber optic, cable, DSL).
9. Compare and contrast storage types (e.g., volatile vs. non-volatile, local storage types, local network storage types, cloud storage).
10. Compare and contrast common computing devices and their purposes (e.g., mobile phones, gaming consoles, IoT (internet of things), security systems, IP (internet protocol) camera).
11. Explain basic networking concepts (e.g., DNS, LAN vs WAN, IP address, HTTP/S, POP, IMAP, SMTP, modem, switch, firewall, VOIP).
12. Explain the basic features and functions of wireless devices (e.g., airdrop, unlocking/security, bluetooth pairing, wireless connection setup, mail configuration, airplane mode).
13. Configure and secure a basic wireless network.
14. Describe Material Safety Data Sheets (MSDS).

H. APPLICATIONS AND SOFTWARE

IT professionals demonstrate knowledge and skills for identifying and explaining the uses of applications and software, including installation and maintenance. The following accountability criteria are considered essential for students in IT programs of study.

1. Explain the purpose of operating systems.
2. Compare and contrast common mobile and desktop operating systems and their functions

- and features for Android, Linux, iOS, Windows, and Chrome OS.
3. Compare and contrast components of an operating system (e.g., File systems and features, File management, Services, Processes, Drivers, Utilities, Interfaces).
 4. Explain the purpose and proper use of software (e.g., Productivity software, Collaboration Software, Business software, virtualization, open source).
 5. Describe software compatibility in relationship to operating systems.
 6. Identify common file types and their extensions (e.g., documents, audio, images, video, executables, and compression formats).
 7. Explain methods of application architecture and delivery models (e.g., Application delivery methods, Network required, Application architecture).
 8. Given a scenario, configure and use web browsers.
 9. Compare and contrast general application concepts and uses.

I. SOFTWARE DEVELOPMENT CONCEPTS

IT professionals demonstrate knowledge and skills for software development. The following accountability criteria are considered essential for students in IT programs of study.

1. Compare and contrast programming language categories.
2. Use programming organizational techniques and interpret logic.
3. Explain the purpose and use of programming concepts.

J. DATABASE FUNDAMENTALS

IT professionals demonstrate fundamental knowledge and skills of databases. The following accountability criteria are considered essential for students in IT programs of study.

1. Explain database concepts and the purpose of a database.
2. Compare and contrast various database structures (e.g., structured vs. semi-structured vs. non-structured, relational databases, non-relational databases).
3. Summarize methods used to interface with databases (e.g., relational methods such as data manipulation or data definition, database access methods, export/import).

K. SECURITY

IT professionals demonstrate knowledge and skills for identifying and explaining the important use of security measures to protect personal information and digital equipment. The following accountability criteria are considered essential for students in IT programs of study.

1. Research and discuss common security threats found in IT.

2. Summarize confidentiality, integrity and availability concerns (e.g., confidentiality, integrity, availability concerns).
3. Explain methods to secure devices and best practices (e.g., antivirus software, enabling passwords, validating legitimate sources, removal of malicious software).
4. Summarize methods and concepts used in IT behavioral security concepts.
 - a. Expectations of privacy when using various computing applications or devices
 - b. Acceptable Use Policy and Procedures
 - c. Handlings of confidential information
5. Compare and contrast authentication, non-repudiation, authorization, and accounting concepts (e.g., biometrics, video, digital signatures).
6. Explain password best practices (e.g., length, complexity).
7. Explain common uses of encryption (e.g., HTTPS, VPN).
8. Explain business continuity concepts (e.g., disaster recovery, redundancy, data backup, contingency plans).

L. EMERGING TECHNOLOGIES (OPTIONAL)

IT professionals demonstrate knowledge of emerging technologies. The following accountability criteria are considered essential for students in any IT program of study.

1. Research the field of emerging technologies.
2. Identify the following emerging technologies and their purpose (e.g., AR/VR, Artificial Intelligence, blockchain, chatbots, cloud computing, dynamic network analysis, gesture-based interaction, marketing automation, podcasting, predictive analytic, predictive sales, streaming media (audio/video), telepresence).
3. Research and present an emerging technology to solve a real-world problem.

M. COMPUTATIONAL THINKING

IT professionals demonstrate effective thinking and problem solving skills. The following accountability criteria are considered essential for students in the IT programs of study.

1. Apply strategies for identifying routine hardware and software problems current to everyday life.
2. Identify compatibility issues and describe operational problems caused by hardware errors.
3. Explain how technology can be used to solve problems.
4. Explain the software development process used to solve problems.
5. Explore commonly used documentation tools for design specifications (e.g., flowcharts, visual and textual storyboards).

N. CAREER DEVELOPMENT

IT professionals prepare to be successful in a career in the IT or IS fields. The following accountability criteria are considered essential for students in the IT programs of study.

1. Compare and contrast careers in IT/IS with their education, training requirements, industry certifications and salary ranges.
2. Describe how computing enhances other career fields.
3. Connect with colleges and companies by using various networking platforms.

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