

Career & Technical Education | Information Technology Computer and Mobile Applications

Subject Code: 145020

Outcome & Competency Descriptions

Course Description:

Students will learn to create applications for mobile devices using a variety of commercial and open-source software. They will install these applications, modify them, and develop customer service skills to handle user issues. Knowledge and skills related to customer service in professional situations, small businesses, departments, work groups, and corporate information services will be addressed.

Strand 1. Business Operations / 21st Century Skills

Learners apply principles of economics, business management, marketing and employability in an entrepreneur, manager, and employee role to the leadership, planning, developing, and analyzing of business enterprises related to the career field.

Outcome: 1.1. Employability Skills

Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.

Competencies

- 1.1.1. Identify the knowledge, skills, and abilities necessary to succeed in careers.
- 1.1.2. Identify the scope of career opportunities and the requirements for education, training, certification, licensure, and experience.
- 1.1.3. Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options.
- 1.1.4. Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships.
- 1.1.5. Develop strategies for self-promotion in the hiring process (e.g., filling out job applications, resumé writing, interviewing skills, portfolio development).
- 1.1.7. Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions.
- 1.1.8. Identify the correlation between emotions, behavior, and appearance and manage those to establish and maintain professionalism.
- 1.1.9. Give and receive constructive feedback to improve work habits.
- 1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect for them.

Outcome: 1.2. Leadership and Communications

Process, maintain, evaluate, and disseminate information in a business.
Develop leadership and team building to promote collaboration.

Competencies

- 1.2.2 Deliver formal and informal presentations.
- 1.2.3 Identify and use verbal, nonverbal, and active listening skills to communicate effectively.
- 1.2.4 Use negotiation and conflict-resolution skills to reach solutions.
- 1.2.5 Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose.
- 1.2.6 Use proper grammar and expression in all aspects of communication.
- 1.2.7 Use problem-solving and consensus-building techniques to draw conclusions and determine next steps.
- 1.2.11 Write professional correspondence, documents, job applications, and resumés.
- 1.2.12 Use technical writing skills to complete forms and create reports.
- 1.2.13 Identify stakeholders and solicit their opinions.

Outcome: 1.3. Business Ethics and Law

Analyze how professional, ethical, and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.

Competencies

- 1.3.4 Identify how federal and state consumer protection laws affect products and services.
- 1.3.7 Identify the labor laws that affect employment and the consequences of noncompliance for both employee and employer (e.g., harassment, labor, employment, employment interview, testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal Employment Opportunity Commission [EEOC]).

Outcome: 1.7. Entrepreneurship / Entrepreneurs

Analyze the environment in which a business operates, and the economic factors and opportunities associated with self-employment.

Competencies

- 1.7.13 Protect intellectual property and knowledge (e.g., copyright, patent, trademark, trade secrets, processes).

Outcome: 1.8. Operations Management

Plan, organize and monitor an organization or department to maximize contribution to organizational goals and objectives.

Competencies

- 1.8.2 Select and organize resources to develop a product or a service.

Strand 2. IT Fundamentals

Learners apply fundamental principles of IT, including the history of IT and its impact on society, common industry terms, systems theory, information storage and retrieval, database management, and computer hardware, software, and peripheral device configuration and installation. This base of knowledge and skills may be applied across the career field.

Outcome: 2.14. Artificial Intelligence

Understand and apply prescribed methods of using Artificial Intelligence.

Competencies

- 2.14.1. Describe how machine learning and neural networks operate differently than standard decision trees.
- 2.14.3. Write and revise a prompt to generate the desired response from an AI.
- 2.14.4. Evaluate the result of an AI query on a variety of parameters (e.g. validity, relevance, authenticity, potential bias and hallucinations).
- 2.14.6. Critically analyze scenarios involving AI usage.

Outcome: 2.15. UX/UI Design

Develop basic skills and knowledge of the UX/UI Design Process.

Competencies

- 2.15.4. Develop a user persona to help inform the design process.
- 2.15.5. Conduct and analyze competition research.
- 2.15.6. Design interface elements and experiences that connect concepts with the real world (i.e. Skeuomorphic Design).
- 2.15.7. Implement UI patterns and libraries, such as navigation elements and icons.
- 2.15.8. Draft, design, and utilize design prototypes (low-fidelity, high-fidelity) to guide the design process.
- 2.15.10. Understand how the use of appropriate iconography impacts user experience
- 2.15.11. Understand various design methodologies (Bottom-Up, Top-Down, Agile,) and evaluate their strengths and weaknesses.
- 2.15.12. Describe how attention, memory, perception, conditioning, and learning define the user experience and affects their actions.
- 2.15.13. Describe how usability heuristics develop a better experience for the end-user.

Strand 5. Programming and Software Systems

Learners apply principles of computer programming and software development to develop code; build, test, and debug programs; create finished products; and plan, analyze, design, develop, implement, and support software applications.

Outcome: 5.1. Programming Concepts

Describe programming concepts.

Competencies

- 5.1.3. Model the solution using both graphic tools (e.g., flowcharts, IPO charts, UML, decision trees, logic tables), pseudocode techniques and artificial intelligence.
- 5.1.6. Analyze the strengths and weaknesses of different languages for solving a specific problem.
- 5.1.7. Compare and contrast the functions and operations of compilers and interpreters.
- 5.1.8. Describe version control and the relevance of documentation.

Outcome: 5.2. Computational and String Operations

Develop code that performs computational and string operations.

Competencies

- 5.2.2. Identify the scope of data (e.g., global versus local, variables, constants, arrays).
- 5.2.3. Write code that uses arithmetic operations.
- 5.2.4. Write code that applies string operations (e.g., concatenation, pattern matching, substring).

Outcome: 5.3. Logical Operations and Control Structures

Develop code that uses logical operations and control structures.

Competencies

- 5.3.3. Write code that uses logical operators (e.g., and, or, not).
- 5.3.4. Write code that uses relational operators and compound conditions.
- 5.3.5. Write code that uses conditional control structures (e.g., if, if-then-else).
- 5.3.6. Write code that uses repetition control structures (e.g., while, for).
- 5.3.7. Write code that uses selection control structures (e.g., case, switch).
- 5.3.8. Write code that uses nested structures and recursion.
- 5.3.9. Write code that creates and calls functions.
- 5.3.10. Code error handling techniques.
- 5.3.11. Write code to access data repositories.
- 5.3.12. Write code to create classes, objects, and methods.

Outcome: 5.4. Integrated Development Environment

Build and test a program using an integrated development environment (IDE).

Competencies

- 5.4.1. Configure options, preferences, and tools.
- 5.4.2. Write and edit code in the integrated development environment (IDE).
- 5.4.3. Compile or interpret a working program.
- 5.4.4. Define test cases.
- 5.4.5. Test the program using defined test cases.
- 5.4.6. Correct syntax and runtime errors.
- 5.4.7. Debug logic errors.

Outcome: 5.5. Programming Conventions

Develop programs using applications security best practices according to information security policies (e.g., cross-site scripting, Structured Query Language [SQL] injection attack, bounds_-checking).

Competencies

- 5.5.1. Develop programs using data validation techniques.
- 5.5.2. Develop programs that use reuse libraries.
- 5.5.3. Develop programs using operating system calls.
- 5.5.4. Develop programs that call other programs.
- 5.5.5. Use appropriate naming conventions and apply comments.
- 5.5.6. Format output (e.g., desktop, mobile, enterprise, reports, data files).
- 5.5.7. Read inputs (e.g., user input, data file, sensors, databases, APIs).

Outcome: 5.6. Software Development Lifecycle

Apply the software development lifecycle (SDLC).

Competencies

- 5.6.1. Determine requirements specification documentation.
- 5.6.2. Identify constraints and system processing requirements.
- 5.6.3. Develop and adhere to timelines.
- 5.6.4. Identify a programming language, framework, and an integrated development environment (IDE).
- 5.6.5. Identify input and output (I/O) requirements.
- 5.6.6. Design system inputs, outputs, and processes.
- 5.6.7. Document a design using the appropriate tools (e.g., program flowchart, dataflow diagrams, Unified Modeling Language [UML]).
- 5.6.8. Create documentation (e.g., implementation plan, contingency plan, data dictionary, user help).
- 5.6.9. Review the design (e.g., peer walkthrough).
- 5.6.10. Present the system design to stakeholders.
- 5.6.11. Develop the application.
- 5.6.12. Compare and contrast software methodologies (e.g., agile, waterfall).
- 5.6.13. Perform code reviews (e.g., peer walkthrough, static analysis).
- 5.6.14. Ensure code quality by testing and debugging the application (e.g., system testing, user acceptance testing).
- 5.6.15. Train stakeholders.
- 5.6.16. Deploy the application.
- 5.6.17. Collect application feedback and maintain the application.

Outcome: 5.7. Configuration Management

Describe configuration management activities.

Competencies

- 5.7.1. Explain version management and interface control.

Strand 7. Digital Media

Learners apply principles of digital media to produce interactive media; develop and produce multimedia applications; integrate typography into media; create 3D models and 2D and 3D animation; and create digital video, audio, and photographs.

Outcome: 7.1. Interactive Media

Describe and explain interactive media and interactive media production.

Competencies

- 7.1.1. Identify the types and uses of interactive media environments (e.g., web-based, kiosks, games, mobile devices, video, print).
- 7.1.2. Describe the components of interactive media.
- 7.1.3. Identify the major characteristics of interactive media presentations.
- 7.1.4. Identify important historical developments and future trends in interactive media.
- 7.1.5. Identify the major interactive media genres.
- 7.1.6. Perform critical review of interactive media products in different genres.
- 7.1.7. Identify the intellectual property rights, responsibilities, and controls related to interactive media.
- 7.1.8. Analyze the social and cultural implications of interactive media.
- 7.1.9. Identify major applications for interactive media (e.g., sales and marketing, interactive advertising, education, online learning, corporate training, corporate communications, news, entertainment).
- 7.1.10. Identify specific uses for interactive media in potential markets.

Outcome: 7.2. Multimedia Tools

Develop navigational structures, scripts, storyboards, and flowcharts for multimedia applications.

Competencies

- 7.2.1. Develop navigational structures, wireframes, and flowcharts for multimedia applications.
- 7.2.2. Construct and place navigational units.
- 7.2.3. Build in interactive elements.
- 7.2.4. Determine uses and needs for site maps, multimedia scripts, storyboards, and flowcharts.
- 7.2.5. Make preliminary sketches showing placement of images and text on screen.
- 7.2.6. Place buttons and navigational graphics.
- 7.2.7. Select colors based on color theory and psychology.
- 7.2.8. Describe music, video, and special effects to be used.
- 7.2.9. Provide a sample layout to stakeholders for review.
- 7.2.10. Select and create visual design elements appropriate for the intended audience and use.
- 7.2.11. Develop client personas and narratives for intended project outcomes.

Outcome: 7.4. Graphics

Construct and manipulate digital graphics.

Competencies

- 7.4.1. Select and manipulate color profiles (e.g., Red Green Blue [RGB], Cyan Magenta Yellow Key [CMYK], Pantone) for appropriate uses.
- 7.4.2. Select color, shape, size, and texture of objects.
- 7.4.3. Create or acquire graphics.
- 7.4.4. Manipulate and layer objects.
- 7.4.5. Differentiate between vector and raster images.
- 7.4.9. Describe and select color profiles (e.g., Red Green Blue [RGB], Cyan Magenta Yellow Key [CMYK], Pantone).