

# Career & Technical Education | Information Technology

## User-Focused Design Principles

**Subject Code: 145165**

### Outcome & Competency Descriptions

#### Course Description:

Students will learn the principles of designing user-centric experiences and apply them to issues in programming and design. Students will learn vision mapping, wireframing, and skeuomorphic design. Students will learn to conduct user-focused research, including developing user tasks and personas. Students will learn how human psychology influences consumers interacting with a program or design.

#### Strand 1. Business Operations/21<sup>st</sup> 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: 1.2. Leadership and Communications

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


#### Competencies

- 1.2.1. Extract relevant, valid information from materials and cite sources of information.
- 1.2.2. Deliver formal and informal presentations.
- 1.2.3. Identify and use verbal, nonverbal, and active listening skills to communicate effectively.
- 1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an intended audience and purpose.
- 1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and determine next steps.
- 1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team.
- 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

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- 1.3.4. Identify how federal and state consumer protection laws affect products and services.

**Outcome: 1.5. Global Environment**

Evaluate how beliefs, values, attitudes and behaviors influence organizational strategies and goals.

**Competencies**

1.5.7. Use intercultural communication skills to exchange ideas and create meaning.

**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 2.4. Emerging Technologies**

Identify trending technologies, their fundamental architecture, and their value in the marketplace.

#### **Competencies**

- 2.4.1. Identify emerging technologies that are applicable to the marketplace.
- 2.4.2. Describe the fundamental architectures of emerging technologies and how they are integrating into the existing systems of information technology.
- 2.4.3. Research the value of emerging technologies on the marketplace.
- 2.4.4. Describe emerging technologies (e.g., Bring your Own Device [BYOD], Services Virtualization, Mixed Reality [MR], SMART Devices, Additive Manufacturing [3D Printing], Internet of Things, Large Language Models, Machine Learning, and Artificial Intelligence).

### **Outcome: 2.7 Applications and Architecture**

Explain the fundamentals of delivering information and applications using web architecture.

#### **Competencies**

- 2.7.2. Describe ways to present data (e.g., responsive web design, mobile applications, desktop applications, web applications).
- 2.7.4. Identify how the use of different browsers and devices effects the function of a webpage (e.g., Americans with Disabilities Act [ADA], text-to-speech, screen reader, mobile vs. desktop).

### **Outcome: 2.9. Project Concept Proposal**

Develop a project concept proposal.

#### **Competencies**

- 2.9.1. Identify the scope and purpose of branding.
- 2.9.2. Determine the scope and purpose of the project.
- 2.9.3. Determine the target audience, client needs, expected outcomes, objectives, and budget.

- 2.9.4. Develop a conceptual model and design brief for the project.
- 2.9.5. Develop a timeline, a communication plan, a task breakdown, costs (e.g., equipment, labor), deliverables, and responsibilities for completion.
- 2.9.6. Develop and present a comprehensive proposal to stakeholders.

**Outcome: 2.12. Performance Tests and Acceptance**

Develop performance tests and acceptance plans.

**Competencies**

- 2.12.1. Create a written procedure agreed by the stakeholders and project team for determining the acceptability of the project deliverables.
- 2.12.2. Develop a test system that accurately mimics external interfaces.
- 2.12.3. Develop test cases that are realistic, compare with expected performance, and include targeted platforms and device types.
- 2.12.4. Develop, perform, and document usability and testing integration.
- 2.12.5. Make corrections indicated by test results.
- 2.12.6. Seek stakeholder acceptance upon successful completion of the test plan.

**Outcome: 2.13. Rollout and Handoff**

Plan rollout and facilitate handoff to customers.

**Competencies**

- 2.13.1. Include overall project goals and timelines in the rollout plan.
- 2.13.2. Communicate rollout plans to key stakeholders in a timely manner.
- 2.13.3. Conduct final review and approvals according to company standards.
- 2.13.4. Identify support staff, training needs, and contingency plans in the rollout plan.
- 2.13.5. Test delivered application to assure that it is fully functional for the customer or user and meets all requirements.
- 2.13.6. Deliver support and training materials.

## **Outcome: 2.15. UX/UI Design**

Develop basic skills and knowledge of the UX/UI design process.

### **Competencies**

- 2.15.1. Understand the UX/UI design process (e.g. vision, journey mapping, wireframing, prototyping, strategizing) for the targeted platform (e.g. graphics, applications, programming).
- 2.15.2. Conduct and analyze research (focus testing, beta testing) with the end user in mind.
- 2.15.3. Design user tasks and evaluate results (e.g. use-case scenarios, tabletop exercises, wireframe testing).
- 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.
- 2.15.9. Design or select appropriate icons for specific user interaction elements.
- 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**

- 5.1.1.    Describe how computer programs and scripts can be used to solve problems (e.g., desktop, mobile, enterprise, AI, cloud).
- 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.
- 5.1.8.    Describe version control and the relevance of documentation.

### **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.
- 5.6.12. Compare and contrast software methodologies (e.g., agile, waterfall).

## **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**

- 7.1.7. Identify the intellectual property rights, responsibilities, and controls related to 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).

### **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.



- 7.2.5. Make preliminary sketches showing placement of images and text on screen.
- 7.2.7. Select colors based on color theory and psychology.
- 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: 7.3.      Production**

Produce interactive media.

**Competencies**

- 7.3.1. Select the media elements to be used (e.g., sound, video, graphics, text, animation).
- 7.3.2. Generate text for multi-image presentations (e.g., title graphics, charts, graphs).
- 7.3.3. Incorporate graphics (e.g., digital, hand-drawn, photographic).

**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.
- 7.4.6. Select graphic software applications based on budget, technical capabilities and hardware specifications to meet intended project outcome.
- 7.4.7. Manipulate graphic objects.
- 7.4.8. Compress and decompress graphic files.
- 7.4.9. Describe and select color profiles (e.g., Red Green Blue [RGB], Cyan Magenta Yellow Key [CMYK], Pantone).

**Outcome: 7.5.      Typography**

Integrate typography in media.



## Competencies

- 7.5.2. Mix families of type within a project.
- 7.5.4. Identify appropriate typefaces (e.g., serif, sans serif, Web Safe, screen, print).
- 7.5.5. Prepare a type style guide.