

# Career & Technical Education | Information Technology

## Interactive Applications Development

**Subject Code: 145125**

### Outcome & Competency Descriptions

#### Course Description:

Students will learn skills to support and create interactive and engaging components for web and standalone interactive applications. Using commercial and opensource programs and applications, students will master web interactivity with advanced techniques.

#### 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

- 1.1.4. Describe the role and function of professional organizations, industry associations, and organized labor and use networking techniques to develop and maintain professional relationships.
- 1.1.7. Apply problem-solving and critical-thinking skills to work-related issues when making decisions and formulating solutions.

#### 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.

- 1.2.10. Use interpersonal skills to provide group leadership, promote collaboration, and work in a team.
- 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**

- 1.3.2. Follow protocols and practices necessary to maintain a clean, safe, and healthy work environment.

**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).

## **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: 2.7 Applications and Architecture**

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

- 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: 2.14. 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**

- 2.15.1. Understand the UX/UI design process (e.g. vision, journey mapping, wireframing, prototyping, strategizing) for the targeted platform (e.g. graphics, applications, programming).
- 2.15.5. 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 3. Information Security**

Learners apply principles of information security to implement and maintain security compliance and network security. Learners select components and mechanisms required for a multilayer defense structure and evaluate and minimize security risks to wired and wireless networks and devices.

**Outcome: 3.2. General Security Compliance**

Implement and maintain general security compliance.

**Competencies**

- 3.2.1. Identify and implement data and application security.

## **Strand 6. Web Development**

Learners apply principles of design and technology, including programming standards and protocols, to create, test, host, and maintain web pages and websites with text, graphics, multimedia, scripting, linking, and data integration in a structure that is easy to navigate and accessible for all users via a variety of hardware and software platforms.

### **Outcome: 6.1. Web Pages**

Create basic web pages.

#### **Competencies**

- 6.1.1. Describe the basic principles of Hypertext Markup Language (HTML) and its functional relationship with web browsers.
- 6.1.2. Plan a web page considering subject, devices, audience, layout, color, links, graphics, and Americans with Disabilities Act (ADA) requirements.
- 6.1.3. Format the content of a web page using HTML formatting tags (e.g., hyperlink, e-mail, table formatting, graphic attributes).
- 6.1.4. Use writing process techniques (i.e., drafting, revising, editing, proofreading) to check the web page for format and text accuracy.
- 6.1.5. Create and format ordered and unordered lists on a web page using HTML list formatting tags.
- 6.1.6. Create and format a table in a web page using HTML table formatting tags and attributes.
- 6.1.7. Integrate styles (e.g., inline or external Cascading Style Sheets [CSS]).

### **Outcome: 6.2. Links and Multimedia**

Add links to a web page and insert multimedia files.

#### **Competencies**

- 6.2.1. Create absolute links and relative links.
- 6.2.2. Write a Hypertext Markup Language (HTML) anchor that links to another section of the same web page.
- 6.2.3. Create hyperlinks that send e-mail messages and download files.
- 6.2.4. Insert image and wrap text around the image using Cascading Style Sheets (CSS).
- 6.2.5. Resize a graphic image in a web page using CSS.
- 6.2.6. Insert media files (e.g., audio, video) into a web page using HTML tags.
- 6.2.7. Build a hover or mouseover effect to change the style of a link.

### **Outcome: 6.3. Scripting**

Integrate scripting into a web page.

#### **Competencies**

- 6.3.1. Select and apply scripting languages used in web development.
- 6.3.2. Insert client-side script into a web page.
- 6.3.3. Insert comments into client-side scripts.

## **Outcome: 6.4.      Web Forms**

Integrate forms into a web page.

### **Competencies**

- 6.4.1. Design a data entry form from specifications that will accept a variety of user inputs (e.g., radio buttons, text entry fields, check boxes, drop-down menus).
- 6.4.2. Write the Hypertext Markup Language (HTML) code to add a form to a web page.
- 6.4.3. Write the HTML code to add text entry fields, radio buttons, check boxes, drop-down menus, and other user inputs to a form.
- 6.4.4. Explain the concept of a form action.
- 6.4.5. Write the HTML code to add a working button (e.g., submit, reset) to a form.
- 6.4.6. Format a completed form using HTML and Cascading Style Sheets (CSS) (e.g., fieldset, tabindex).
- 6.4.7. Code scripting to interact with data sources (e.g., database, web services).

## **Outcome: 6.5.      Websites**

Create and update a website.

### **Competencies**

- 6.5.1. Implement web programming standards and protocols (e.g., World Wide Web Consortium [W3C], Hypertext Markup Language [HTML] 5).
- 6.5.2. Plan a website's structure for navigation and usability.
- 6.5.3. Utilize standard web programming languages (e.g., markup, scripting languages) in website development.
- 6.5.4. Install and configure a content management system (CMS).
- 6.5.5. Select an integrated development environment (IDE).
- 6.5.6. Create and edit a web page template.
- 6.5.7. Create and attach Cascading Style Sheets (CSS).
- 6.5.8. Format website layout (e.g., targeted platforms, text formatting, background color, text, tables, lists, iframes).
- 6.5.9. Incorporate audio and video, forms, and links on a website.
- 6.5.10. Develop and execute usability tests on a completed website, checking for information accessibility, ease of use, and navigation.
- 6.5.11. Code a website for cross-platform and cross-browser compatibility and validation.
- 6.5.12. Publish the completed website to a web server.
- 6.5.13. Integrate responsive design into web development.
- 6.5.14. Incorporate Search Engine Optimization (SEO) into webpages.

## **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**

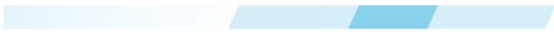
- 7.1.1. Identify the types and uses of interactive media environments (e.g., web-based, kiosks, games, mobile devices, video, print).
- 7.1.8. Analyze the social and cultural implications of interactive media.
- 7.1.9. Identify major applications for interactive media (e.g., sales and marketing, interactive 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.





## **Strand 9. Cybersecurity**

Learners apply principles of Cybersecurity to secure and defend information technology systems, selection and implementation of methods and tools to secure physical and digital assets, manage threats, deploy countermeasures, and establish strategies to protect business information using risk and incident management

### **Outcome: 9.3. Application Development Security**

Develop and maintain application security.

#### **Competencies**

- 9.3.1. Identify application vulnerabilities (e.g., Cross-site scripting, SQL injection, LDAP injection, XML injection, Directory traversal/command injection, Buffer overflow, Integer overflow, Zero-day, Cookies and attachments, Locally Shared Objects (LSOs), Flash cookies, Malicious add-ons, Session hijacking, Header manipulation, Arbitrary code execution/remote code execution).
- 9.3.3. Implement secure coding concepts (e.g., Error and exception handling, Input validation, Cross-site scripting prevention, Cross-site Request Forgery, (XSRF) prevention, OWASP).
- 9.3.4. Implement secure application configuration (e.g., Application hardening, Application patch management).