# Mobile App Development

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| **Primary Career Cluster:** | Information Technology |
| **Course Contact:** | CTE.Standards@tn.gov |
| **Course Code(s):** | C10H22 |
| **Prerequisite(s):** | *Algebra I* (G02X02, G02H00), *Computer Science Foundations* (C10H11) Coding I (C10H14) |
| **Credit:** | 1 |
| **Grade Level:** | 11 |
| **Focus Elective Graduation Requirements:** | This course satisfies one of three credits required for an elective focus when taken in conjunction with other *Information Technology* courses. |
| **Program of Study (POS) Concentrator:** | This course satisfies one out of two required courses that meet the Perkins V concentrator definition, when taken in sequence in the approved program of study. |
| **Programs of Study and Sequence:** | This is an option for the third course in the *Coding* program of study. |
| **Aligned Student Organization(s)** | SkillsUSA: http://www.tnskillsusa.com <br> Technology Student Association (TSA): http://www.tntsa.org |
| **Coordinating Work-Based Learning:** | Teachers are encouraged to use embedded WBL activities such as informational interviewing, job shadowing, and career mentoring. For information, visit https://www.tn.gov/content/tn/education/career-and-technical-education/work-based-learning.html. |
| **Available Student Industry Certifications:** | Students are encouraged to demonstrate mastery of knowledge and skills learned in this course by earning the appropriate, aligned department-promoted industry certifications. Access the promoted list here for more information. |
| **Teacher Endorsement(s):** | 037, 041, 055, 056, 057, 152, 153, 203, 204, 311, 413, 434, 435, 436, 470, 474, 475, 476, 477, 582, 595, 740, 742, 952, 953 |
| **Required Teacher Certifications/Training:** | All endorsements except for 742 will require either the NOCTI test code 5906: Computer Programming certification **or** the equivalent of twelve semester hours of computer course work including at least six hours of programming language. |
| **Teacher Resources:** | https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-information-technology.html |

## Course Description

*Mobile App Development* is a course intended to teach students the basic concepts and skills of mobile app design. The course places an emphasis on the history of mobile technologies, design and development methodologies, code for mobile applications, application lifecycles, APIs, mobile device controls, user interfaces, deployment, publishing for mobile devices, developer tools, and career development. Upon completion of this course, proficient students will be demonstrate and understanding of mobile app development concepts.

## Program of Study Application

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and mobile app design-related careers in the Information Technology career cluster. This is a third course option in the *Coding* program of study.  For more information on the benefits and requirements of implementing this program in full, please visit the Information Technology website at https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-information-technology.html.

## Course Standards

**Introduction to Mobile Technologies**

1) Using news articles and instructional materials, investigate key milestones in the development of how mobile technologies came to be. Create and present a document and/or illustration depicting the timeline of development that led current major mobile platforms and describe the effects upcoming mobile platforms may have on mobile technologies. For example, students should include:
   a. Early Applications (calculators, basic arcade games, calendars)
   b. Wireless Application Protocol (WAP) and Wireless Markup Language
   c. Proprietary Mobile Platforms (Palm OS, Java Micro Edition, iPhone iOS, Android)
   d. Commercialization of Applications
   e. 'Mobile First' Approach

2) Investigate the different physical capabilities of a mobile device including: identifying different device sensors, built-in hardware, and the specifications of the camera. Create a chart that outlines the physical capabilities of a particular mobile device.

3) Compare and contrast the benefits, features, Application Programming Interface (API's), number of touch points, networking, energy savings, and typical applications of common modern mobile devices. Craft an argument to defend the choice of a certain key features, developing claim(s) and counterclaim(s) with specific textual evidence and reasoning.

**Career Exploration**

4) Explore career opportunities, trends, and requirements related to careers in mobile applications such as developer, architect, UI designer, interaction designer, product manager, and more. Produce a career pathways chart or other graphic detailing the

aptitudes and training required (including personal aptitudes, postsecondary credentials, and licensing) for careers of interest.

5) Research educational opportunities to determine programs, degrees, and training availability to improve job prospects in mobile application development. Synthesize findings into a presentation, document, spreadsheet data/chart, or other format highlighting the type of opportunity, focus, time commitment, cost, and outcomes.

**Mobile Applications Overview**

6) Investigate the size and scope of the mobile application market including the rising popularity of mobile apps, and implications for various industries (gaming, location based navigation services, factory automation, banking, online shopping). For instance, investigate the growth of mobile medical apps and discuss security and privacy concerns and reliance on the internet.  Discuss the global market and availability and use of mobile applications in developing countries and emerging economies.

7) Differentiate between types of mobile applications, including native applications, web applications, and hybrid applications. Identify pros and cons of each type and instances where each type would be the best suited for a particular task.

8) Identify major categories of mobile applications: social networking, books, business and finance, lifestyle, travel, navigation, productivity and as a class, create, review, and revise a presentation explaining the different categories by citing resources and identifying examples of mobile applications.

9) Understand privacy needs in the development of mobile applications and explore the role security considerations play in development. Research examples of how security and privacy leaks in mobile applications have affected users and society. Students should evaluate a mobile application in terms of meeting privacy needs, legal and intellectual property requirements, and security considerations (such as preventing attacks from malicious hackers, building secure applications, preventing data leaks, secure mobile transactions for in-app purchases).

10) Define Device Application Programming Interface (DAP) and discuss advantages/disadvantages for utilizing API in mobile application development. List types of common DAPs available to developers (mapping/geolocation, device orientation, vibration, forms, media, etc.) and provide an example of an application that utilizes each type.

11) Explore programming languages used in development of mobile applications, including Objective-C, Swift, C#, Java, Ruby, and JavaScript. Demonstrate an understanding why apps use different languages for development and discuss cross-platform app design.

12) Identify the most commonly used developer tools and platforms. Communicate this information and engage each other effectively using appropriate wiki's and blogs to support individual learning and contribute to the learning of others.

**Mobile Applications Design**

13) Describe elements of mobile application design which includes designing for multiple devices, screen sizes, browsers, and operating systems. Discuss how developers design applications for the best user experience.

14) Identify and be able to apply the principles of user interface design, including:
   - Why designing applications that are intuitive and user-friendly is important
   - How design can make common tasks easy
   - How to design applications for users with disabilities
   - How to handle user errors and provide feedback

15) Apply user interface design criteria, such as navigating the app, user input, gestures, orientation, communication (alerts, confirmations, and feedback), first impression of the polish of the design, launch time, to critique common user interfaces in mobile applications. Discuss how the design can motivate or demotivate a user. Compare and contrast various applications based on usability.

**Mobile Application Development**

16) Demonstrate an understanding of the mobile application life cycle and the iterative nature of a lifecycle. Understand and use steps for designing a good software product.

17) Develop an idea into a project plan then write pseudocode and construct a flowchart for a process before starting to develop the program code.

18) Develop a mobile application and write original program code using basic Object-oriented programming (OOP) concepts including:
   a. Variables
   b. Methods
   c. Control structures
   d. Data structures
   e. User input

19) When writing program code, demonstrate an ability to evaluate code, identify errors, and troubleshoot bugs.

20) Create a mobile application that incorporates the use of phone controls and a custom control. The application should display content, incorporate notifications, and use tasks to enhance functionality. For example, create a basic time management app.

21) Utilizing the application developed in the previous standard (or another), enhance the application by incorporating user interface design standards and guidelines, including optimizing the layout, designing screen orientation options, colors, transparency.

22) Integrate images and media in the application developed in the previous standards. Students may create appropriate art, develop audio, and create applications animations or utilize pre-existing media.

**Deployment**

23) Demonstrate an understanding for how to deploy a mobile application to the marketplace, including marketplace submission rules and creating the deployment package. Advanced students might deploy an application.

**Project Management**

24) As a team during an extended project, develop a platform-specific mobile application that conforms to acceptable coding standards, including organization and comments and contains appropriate graphics, text, audio, and animations. The team should utilize project management techniques to develop a plan with considerations for cost and time. Additionally, the team should create a design document that details the application, the problem it solves, and its core features.

## Standards Alignment Notes

*References to other standards include:

- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
  - o Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.