MOBILE APPLICATIONS DEVELOPMENT
COURSE CODE: 5378

COURSE DESCRIPTION: In Mobile Applications Development, students will explore basic development, building, and programming of various software applications for mobile devices. Students will also work hands-on individually or in teams and document their progress. Topics discussed include mobile devices, design and development concepts, testing, deployment, marketing, industry specifications. 21st Century skills of collaboration, creativity, decision-making, and teamwork are stressed throughout the course.

OBJECTIVE: Given the necessary equipment, software, supplies, and facilities, the student will be able to successfully complete the following core standards for courses that grant one unit of credit.

RECOMMENDED PREREQUISITE: Fundamentals of Web Page Design and Development, Fundamentals of Computing, OR Introduction to Computer Programming

COMPUTERS REQUIRED: One computer and one mobile device (Smartphone/ tablet) per student

CREDIT: 1 unit (120 hours)

RECOMMENDED GRADE LEVEL: 11-12

A. SAFETY

Proficient professionals know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their positions. The following accountability criteria are considered essential for students in any program of study.

1. Review school safety policies and procedures.
2. Review classroom safety rules and procedures.
3. Review safety procedures for using equipment in the classroom.
4. Identify major causes of work-related accidents in office environments.
5. Demonstrate safety skills in an office/work environment.

B. STUDENT ORGANIZATIONS

Proficient professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their positions. 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 as needed in their positions. 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; illegal downloading; cyberbullying; 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, Creative Commons, fair use laws, and ethics pertaining to downloading of images, photographs, Creative Commons, documents, video, sounds, music, trademarks, and other elements for personal 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 INTERPERSONAL SKILLS

Proficient professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their positions. 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, as needed in their positions. 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. Demonstrates reading and writing skills.
12. Demonstrates workplace safety.

F. MOBILE DEVICES

Mobile application designers understand the impact of mobile applications development, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Design a timeline that describes the major milestones in the development of mobile devices and the market.
2. Examine the global market for availability and use of mobile applications in developing countries/emerging economies and present your findings.
3. List and prioritize the important capabilities that mobile devices should have.
4. Identify relevant input/output devices in regards to mobile devices.
5. Compare and contrast storage capabilities and formats available both locally and remotely for various mobile devices (e.g., cloud, database and file storage, and internal/external).
6. Assess the strengths and weaknesses of various programming languages for various applications (e.g., XML for interface design).

G. DESIGN TECHNIQUES

Mobile application designers implement effective design techniques in mobile applications development, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Develop a plan for an application that identifies
    a. the problem/purpose
    b. audience
    c. input, output, storage, and processing requirements
    d. sample data

2. Solicit and incorporate peer and professional feedback on the application plan including accessibility concerns.
3. Select appropriate components (e.g., text fields, buttons, labels, vertical/horizontal layouts, picture box, list views, etc.) to achieve the purpose of the application.
4. Select the necessary client and server components required to achieve the purpose of the application.
5. Create a wireframe/design sketch/prototype incorporating interface standards and guidelines.
6. Select and evaluate application assets/resources (e.g., images, icons, sounds, video, animation, etc.) for appropriateness in an application.
7. Implement the use of stylesheets to format the application interface.
    a. Implement color choices that account for cultural and psychological interpretations.
    b. Implement color schemes (i.e., monochromatic, analogous, triadic, tetradic) that promote readability, accessibility (to include colorblindness), and ease of use (avoid complimentary).
    c. Select appropriate typography (fonts, font size, font style, etc.) to facilitate readability and accessibility of the application.
8. Implement a variety of design principles (i.e., balance, contrast, dominance, proximity, repetition, continuance, negative space, unity) that promote a positive user experience.
9. Implement security and privacy best practices.

H. DEVELOPMENT TECHNIQUES

Mobile application designers implement effective development techniques, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Create algorithms to solve computational problems that have an application in the real world (e.g., local community, church, civic organization, school, home life) that can be handled by a mobile application.
2. Create valid variables and constants using appropriate data types to store information used in the program.
3. Create data sets that could be used to explore a real world phenomenon or support a claim.
4. Organize collected data to communicate the solution to a real-world phenomenon and support a claim.
5. Decompose tasks into smaller, reusable parts to facilitate the design, implementation, and review of mobile applications.
6. Develop code to solve the smaller parts of a decomposed task that can be reused to solve similar problems (e.g., procedures, functions, objects).
7. Develop mobile applications that utilize conditionals (if, else if, else, switch) to produce multiple outcomes based on input given from a user.
8. Develop mobile applications that utilize the different Control structures (e.g., Sequence logic, Selection logic, iteration Logic) to basically analyze and choose in which direction a program flows based on certain parameters and conditions.
9. Develop mobile applications that utilize Loops (if, else if, else, switch) to produce multiple outcomes based on input given from a user.
10. Develop mobile applications that correctly access remote resources (client/server access).
11. Develop mobile applications that implement security and privacy best practices.

12. Trace the flow of execution of a mobile application that uses a variety of programming constructs (e.g., procedures, modules, objects).
13. Design and iteratively develop mobile applications that combine control structures (e.g., conditionals, loops, event handlers, and recursion).
14. Trace the flow of execution of a mobile application that uses a combination of control structures (e.g., conditionals, loops, event handlers, and recursion).
15. Design a solution through systematic analysis using programming constructs (e.g., procedures, modules, objects).

I. TESTING & REVISION

Mobile application designers implement effective testing and revising techniques in mobile applications development, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Plan and develop programs for a variety of audiences using a process that incorporates development, feedback, and revision as part of a cyclical process.
   a. Review the program.
   b. Build the program.
   c. Execute the program to test the logical validity of an application program given appropriate data.
   d. Identify values of variables at different points in the flow of execution.
   e. Debug the program for errors (e.g., syntax and build errors).
2. Systematically test programs using a range of test cases to meet design specifications (e.g., specific outcomes, functionality, user interface, error handling).
   a. Develop a test strategy.
   b. Create a test plan.
   c. Design a test suite of conditions to evaluate best and worst cases of a program.
   d. Identify the difference between a test case and test script.
   e. Create a test script.
   f. Demonstrate the ability to debug the program for errors (e.g., run-time/exception, and logic/semantic).
   g. Test applications for bias and accessibility issues.

J. DEPLOYMENT

Mobile application designers implement effective strategies for deploying mobile applications, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Examine marketing strategies related to the successful deployment of a mobile app. (e.g., landing page, social media, asking for app reviews, blog articles, giveaways, etc.)
2. Conduct a cost-volume-profit (CVP) analysis to determine the economic justification for deploying the mobile application.
3. Explore branding strategies for the mobile application and implement them into the deployment plan.
4. 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).
5. Demonstrate an understanding for how to deploy a mobile application to the marketplace, including marketplace submission rules.
6. Create a mobile application deployment diagram highlighting the detailed steps of the preferred platform.
7. Justify the selection of a deployment approach based upon the demands of the mobile application design. (e.g., web app, native, hybrid, etc.)
8. Examine legal reference requirements for the preferred platform and incorporate them into the deployment package.
9. Create a system for collecting analytical data for the deployed application. (e.g., number of users, audience segmentation, advertisement engagement, etc.)
10. Develop a plan to monitor and manage the need for version updates, including how and when updates will be implemented. (e.g., app reviews, feedback form, end user data surveys, etc.)
11. Research and develop end user documentation, including the visual application usage guide and End User Agreements.
12. Create a comprehensive deployment package for a mobile application. (Deploy the mobile application, if resources are available.)

K. PROFESSIONAL DEVELOPMENT

Mobile application designers demonstrate effective career-readiness skills, as needed in their roles. The following accountability criteria are considered essential for students in the Information Technology programs of study.

1. Develop an electronic portfolio to include applications, planning documentation and quality assurance reports that demonstrate mobile application design, development, and testing skills.
2. Students are encouraged to demonstrate mastery of knowledge and skills learned in this course by earning the appropriate, aligned department-promoted industry certifications.
3. Research educational opportunities to determine programs, degrees, and training availability to improve job prospects in mobile application development.
4. Identify skills, interests, potential income opportunities, work environment in various careers in the mobile computing world.
5. Incorporate career-specific skills.
6. Research indie mobile applications developers in your community as a possible career opportunity.
7. Develop a functional/skills-based resume that highlights technology skills, courses, experience, certifications, etc.

Additional Materials and Resources

Course Academic Standards and Indicators

Computer Science Academic Standards and Indicators