

Coding Practicum

Primary Career Cluster:	Information Technology (IT)
Course Contact:	CTE.Standards@tn.gov
Course Code(s):	C10H08
Prerequisite(s):	<i>Algebra I</i> (G02X02, G02H00) and <i>Coding II</i> (C10H15)
Credit:	1
Grade Level:	11-12
Focus Elective Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other <i>Information Technology</i> 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 the capstone course in the <i>Coding</i> program of study.
Aligned Student Organization(s):	SkillsUSA: http://www.tnskillsusa.com Technology Student Association (TSA): http://www.tntsa.org
Available Student Industry Credentials:	Credentials are aligned with post-secondary and employment opportunities and with the competencies and skills that students acquire through their selected program of study. For a listing of promoted student industry credentials, visit https://www.tn.gov/education/career-and-technical-education/student-industry-certification.html
Teacher Endorsement(s):	037, 041, 055, 056, 057, 152, 153, 203, 204, 311, 413, 434, 435, 436, 470, 474, 475, 476, 477, 582, 595, 596, 740, 742, 952, 953
Required Teacher Certifications/Training:	All endorsements <u>except for 742</u> 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. If students are assigned in work-based learning settings, teachers must attend WBL training and earn the WBL Certificate provided by the Tennessee Department of Education.
Teacher Resources:	https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-information-technology.html Best For All Central: https://bestforall.tnedu.gov/

Course-At-A-Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry relevant content through general education integration and experiences such as career & technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry standard content and technology, solve industry-based problems, meaningfully interact with industry professionals, and use/produce industry specific, informational texts.

Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing industry specific skills that involve teamwork and project management
- Participate in contests that highlight job skill demonstration; interviewing skills; community service activities, extemporaneous speaking, and job interview
- Participate in leadership activities such as Student2Student Mentoring, National Week of Service, Officer Training, and Community Action Project

For more ideas and information, visit Tennessee SkillsUSA at: <http://www.tnskillsusa.com>

Using Work-based Learning in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standards 1-4** | On the job training.
- **Standards 5-6** | Interview a local attorney on the ethical and legal responsibilities of the coding profession.
- **Standards 7-9** | Integrated project with an industry professional.
- **Standards 10-12** | Have students observe and/or assist on a troubleshooting issue with an industry partner.
- **Standards 13-15** | Have an industry professional evaluate the students' portfolios.

Course Description

Coding Practicum is a capstone course intended to provide students with the opportunity to apply the skills and knowledge learned in previous *Coding* courses toward the completion of an in-depth project with fellow team members. Students who have progressed to this level in the program of study take on more responsibilities for producing independent work and managing processes involved in the planning, designing, refinement, and production of original software applications. The course is designed to allow students to choose their specific application of interest, be it the development of a mobile application (app), an animation package, a game or other educational tool, or any other approved program that requires coding and development skills. Upon completion of the practicum, proficient students will be prepared for postsecondary study and career advancement in programming and software development, and will be equipped to market their finished product should they choose.

Work-Based Learning Framework

Practicum activities may take the form of work-based learning (WBL) opportunities (such as internships, cooperative education, service learning, and job shadowing) or industry-driven project-based learning. These experiences must comply with the Work-Based Learning Framework guidelines established in SBE High School Policy 2.103. As such, this course must be taught by a teacher with an active WBL Certificate issued by the Tennessee Department of Education and follow policies outlined in the Work-Based Learning Policy Guide available online at <https://www.tn.gov/education/career-and-technical-education/work-based-learning.html>. The Tennessee Department of Education provides a *Personalized Learning Plan* template to ensure compliance with the Work-Based Learning Framework, state and federal Child Labor Law, and Tennessee Department of Education policies, which must be used for students participating in WBL opportunities.

Program of Study Application

This is the fourth course 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 Requirements

This capstone course aligns with the requirements of the Work-Based Learning Framework (established in Tennessee State Board High School Policy), with the Tennessee Department of Education's Work-Based Learning Policy Guide, and with state and federal Child Labor Law. As such, the following components are course requirements:

Course Standards

- 1) A student will have a Personalized Learning Plan that identifies their long-term goals, demonstrates how the Work-Based Learning (WBL) experience aligns with their elective focus and/or high school plan of study, addresses how the student plans to meet and demonstrate the course standards, and addresses employability skill attainment in the following areas:
 - a. Application of academic and technical knowledge and skills (embedded in course standards)
 - b. Career knowledge and navigation skills
 - c. 21st Century learning and innovation skills
 - d. Personal and social skills

Programming & Software Development Career Planning

- 2) Research a company or organization that employs computer programmers or specializes in software design and development solutions. Companies could range from large software developers, to niche organizations that retain programmers on staff to serve their particular clients' needs. For the chosen company, cite specific textual evidence from the company's literature, as well as available press coverage (if available) to summarize:
 - a. The mission and history of the organization
 - b. Headquarters and organizational structure
 - c. Products or services provided
 - d. Credentials required for employment and how they are obtained and maintained
 - e. Policies and procedures
 - f. Reports, newsletters, and other documents published by the organization
 - g. Website and contact information
- 3) Analyze the requirements and qualifications for various programming and development job postings identified from specific company websites or online metasearch engines. Gather information from multiple sources, such as sample resumes, interviews with professionals, and job boards, to determine effective strategies for realizing career goals. Create a personal resume modeled after elements based on the findings above, then complete an authentic job application as part of a career search or work-based learning experience.
- 4) Participate in a mock interview. Prior to the interview, research tips on dress and grooming, most commonly asked interview questions, appropriate conduct during an interview, and recommended follow-up procedures. Upon completion of the interview, write a thank you letter to the interviewer in a written or email format.

Professional Ethics and Legal Responsibilities

- 5) Investigate current issues surrounding the use of software applications to collect and track user data. Explore a range of arguments concerning privacy rights as they relate to the mining of personal data; determine when it is ethical and legal to collect data for profit versus for security purposes. Advance an original argument that debates the pros and cons and summarizes the potential ramifications for clients, users, the public, and one's own

personal reputation, drawing on evidence gathered from news media, company policies, and state and federal laws.

- 6) Research a case study involving an ethical issue related to intellectual property rights. Examine a variety of perspectives surrounding the issue, then develop an original analysis explaining the impact of the issue on those involved, using persuasive language and citing evidence from the research. Potential issues include copyright infringement, piracy, plagiarism, art licensing, creative commons, and the state/federal laws that govern them.

Course Project

- 7) In teams or individually, develop a written proposal for an original program or software application that involves advanced refinement and transfer of skills and knowledge acquired in previous *Programming & Software Development* courses. The proposal should be narrative in nature but supplemented by relevant data and graphic illustrations as needed, such as flowcharts of development processes and diagrams or sketches of what the end product would resemble. Sample projects include: developing a mobile app; designing an animation package or plug-in; writing an original game program; or any other programming-based project. Present the proposal to the class, and continually revise based on feedback from peers.
- 8) Throughout the design and development process, develop supplementary documents, presentations, and strategies to support the production and promotion of the program, app, or product. Identify the target market for the product, and devise a tentative plan to inform, promote, and convince prospective users of the product's functions and value. Research marketing plan templates and sample presentations, and synthesize information to produce an original plan outlining how the team intends to market the product once it is finished.
- 9) Apply coding skills learned in previous courses to novel contexts and development environments. For example, develop skills in an emerging technology that would support the completion of the course project, or learn a new programming language not previously studied in order to enhance the functionality of the product.

Advanced Troubleshooting, Critiquing, & Problem Solving

- 10) In the course of developing the project, regularly test for functionality, compatibility, and other design aspects related to user friendliness. Conduct and document the proper code validation to resolve errors encountered in the design process.
- 11) Analyze the code written by another team member or peer and create a flowchart for suggesting changes to improve functionality. Cite specific examples in the code to support recommendations.
- 12) Research and test for potential security threats related to the intended uses of the app, program, or product. For example, if a mobile app is developed, determine the most common security threats and identify areas of vulnerability in the product that could be

remedied by adjusting for the proper code, patching, or system update. If possible, develop and incorporate security measures into the final product to ensure user safety.

Portfolio

13) Create a portfolio, or similar collection of work, that illustrates mastery of skills and knowledge outlined in the previous courses and applied in the practicum. The portfolio should reflect thoughtful assessment and evaluation of the progression of work involving the application of steps of the design process, as outlined by the instructor. The following documents will reside in the student's portfolio:

- a. Personal code of ethics
- b. Career and professional development plan
- c. Resume
- d. Project proposal with supporting documents
- e. List of responsibilities undertaken through the course
- f. Examples of visual materials developed and used during the course (such as drawings, models, presentation slides, videos, and demonstrations)
- g. Marketing plan
- h. Description of technology used, with examples if appropriate
- i. Periodic journal entries reflecting on tasks and activities
- j. Feedback from instructor and/or supervisor based on observations

Communication of Project Results

14) Produce technical reports highlighting the purpose, content, and use of the app, program, and product developed for this course. Cite evidence from multiple authoritative sources in order to justify design and development decisions and maximize the user experience. Incorporate supporting graphics, sketches, and data as needed to summarize the technical specifications of the product.

15) Upon completion of the practicum, develop a technology-enhanced presentation showcasing highlights, challenges, and lessons learned from the experience. The presentation should be delivered orally, but supported by relevant graphic illustrations, such as diagrams, flowcharts, and/or market data on the target users. Prepare the presentation in a format that could be presented to both a technical and a non-technical audience, as well as for a career and technical student organization (CTSO) competitive event.

Standards Alignment Notes

*References to other standards include:

- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
 - 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.