# Scope & Sequence

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| **Course Name:** Extended Computer Technician Practicum  **TSDS PEIMS Code:** 13027505 (First Time Taken)  13027515 (Second Time Taken) | | **Course Credit:** 3.0  **Course Requirements:** Grade Placement 10-12.  **Prerequisites:** None.  **Recommended Prerequisites:** Principles of Information Technology, Computer Maintenance, Computer Maintenance Lab, Networking, and Networking Lab.  **Corequisites:** Computer Technician Practicum. |
| **Course Description:** In the Extended Computer Technician Practicum, students will gain knowledge and skills in the area of computer technologies, including advanced knowledge of electrical and electronic theory, computer principles, and components related to the installation, diagnosis, service, and repair of computer-based technology systems. Students will reinforce, apply, and transfer their knowledge and skills to a variety of settings and problems. Proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an instructor, with an industry mentor, or both. This course must be taken concurrently with Computer Technician Practicum and may not be taken as a stand-alone course. Students shall be awarded one credit for successful completion of this course. | | |
| **NOTE 1:** The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Information Technology Career Cluster. This is a suggested scope and sequence for the course content. This content will work with any textbook, instructional materials or practicum experience. If locally adapted, make sure all TEKS are covered.  **NOTE 2:** Completion of skill sets may be demonstrated throughout the practicum. Therefore, content based on the TEKS does not have to be delivered sequentially. The major reason students take a practicum is to provide additional time on task for learning specialized skills. In most cases where the Extended Practicum is added to the Practicum, it is because the student is spending more than 15 hours per week at his/her training station (place of employment or internship).  **NOTE 3:** The information in this scope and sequence document does not describe detailed activities, because the activities will vary from student to student and training station to training station. The intent is that students incorporate and use previously learned knowledge and skills related to the career cluster. | | |
| **Practicum Plan** | **TEKS Covered**  **130.311 (c) Knowledge and Skills** | |
| **Section 1: Career Exploration and Employability**  Students will expand their knowledge base and interest in careers and entrepreneurship opportunities in the field of Information Technology. Students will explore and discuss employment opportunities and industry certifications and requirements in small groups and as a class as they develop and improve individualized career preparation plans. Students will also discover and use resources available through CTSO or other extracurricular organization(s) to further develop leadership and employability skills. Students will discuss and demonstrate appropriate and proper etiquette and behavior as well as effective listening and speaking skills in this and in all units as they further develop their personal and career goals and increase their interpersonal and employability skills.  Prior to beginning practicums, students will review and discuss professional standards and employers’ expectations, personal and workplace safety and emergency procedures, effective problem solving strategies, positive interpersonal skills, ethical conduct, and effective communication skills. Students will also discuss appropriate technical and academic skills required for the practicum, and put into place strategies for mastering any/all skills necessary to manage and perform work/practicum responsibilities.  Also prior to beginning their practicum experiences, students will agree to adhere to policies and procedures, to demonstrate positive work attitudes and behaviors, including effective planning and time management, to make ethical decisions, and to comply with all applicable rules, laws, and regulations in a consistent manner. | (1) The student demonstrates professional standards/employability skills required by business and industry. The student is expected to:  (A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work;  (B) identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills;  (C) employ effective reading and writing skills;  (D) employ effective verbal and nonverbal communication skills;  (E) solve problems and think critically;  (F) demonstrate leadership skills and function effectively as a team member;  (G) identify and implement proper safety procedures;  (H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and  (I) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.  (2) The student identifies various employment opportunities in the IT field. The student is expected to:  (A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals. | |
| **Section 2: Customer Service and Academic Skills**  Students will expand their knowledge base and interest in customer service through skills-based activities that are supportive of a multi-cultural perspective. Students will apply academic skills in all learning activities and apply knowledge through designs that would be represented in a technical support work environment. | (3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:  (A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers;  (B) complete work orders and related paperwork for repair and installation;  (C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders; and  (D) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.  (4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:  (A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards;  (B) demonstrate proper use of mathematics concepts in the development of products or services; and  (C) demonstrate proper use of science principles to the development of products or services. | |
| **Section 3: Information Technology Services**  Students will develop advanced technical skills in Information Technology services. Students will participate in skilled and technical hands-on activities that will enhance the knowledge and application of computer maintenance and network maintenance concepts. Students will maintain computer systems, computer networks and take on the role of IT administrators. Students will demonstrate safe use of equipment in computer technologies such as hand and power tools, employ available reference tools, materials, and Internet sources to access information as needed, demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies, and identify new and emerging technologies that may affect the field of computer technology such as quantum computing, photonics, and nanotechnology. Students will also demonstrate the knowledge and ability to provide support to computer users to maintain service. | (5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:  (A) explain microprocessor theory;  (B) define the use of Boolean logic in computer technologies;  (C) describe the theories of magnetism, electricity, and electronics as they apply to computer systems;  (D) identify proper troubleshooting techniques;  (E) differentiate among digital and analog input and output electronics theories;  (F) describe the architecture of various computer systems;  (G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units; and  (H) explain computer system environmental requirements and related control devices.  (6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:  (A) demonstrate safe use of equipment in computer technologies such as hand and power tools;  (B) employ available reference tools, materials, and Internet sources to access information as needed;  (C) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies; and  (D) identify new and emerging technologies that may affect the field of computer technology such as quantum computing, photonics, and nanotechnology.  (10) The student provides support to computer users to maintain service. The student is expected to:  (A) employ effective listening skills when working with clients to identify support needs;  (B) identify customer need and formulate a support plan;  (C) create queries and reports and assess critical system information;  (D) employ problem-solving skills in performing support, maintenance, and repair;  (E) use hardware and software diagnostics;  (F) report to the user the cause of and solution to the problem; and  (G) create written documentation indicating the cause of and solution to the problem. | |
| **Section 4: Research and Project Management in IT Services**  Students will identify a problem relating to information technology and develop a solution using appropriate technologies, IT concepts, and IT industry standards. Students will participate in skilled and technical hands-on activities that will allow them to identify and complete a research opportunity in computer maintenance, computer programming or network maintenance, and apply their IT skills in implementing a solution. Students will also present the solution to a panel of professionals using formal presentation skills. | (7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:  (A) identify a problem relating to information technology;  (B) develop a solution using appropriate technologies, IT concepts, and IT industry standards;  (C) explain how the proposed technological solution will resolve the problem and the methodologies involved;  (D) apply decision-making techniques to the selection of technological solutions;  (E) identify areas where quality, reliability, and safety can be designed into a product or service;  (F) apply critical-thinking strategies to analyze and evaluate the proposed technological solution;  (G) develop a sustainability plan for the product or service;  (H) select and use the appropriate technological resources to conduct, research, design, and develop activities;  (I) develop the documentation of the research and development process; and  (J) present the solution to a panel of professionals using formal presentation skills.  (8) The student employs project management knowledge to oversee IT projects. The student is expected to:  (A) implement project methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project, to manage information system projects;  (B) define the scope of work to achieve individual and group goals;  (C) develop time and activity plans to achieve objectives;  (D) implement or participate with cross-functional teams to achieve IT project goals;  (E) develop and implement quality assurance test plans; and  (F) create a contingency plan. | |
| **Section 5: Cyber Security**  Students will engage in advanced opportunities to develop technical skills in Cyber Security. Students will participate in skilled and technical hands-on activities that will enhance the knowledge and application in system hardening, network administration and ethical hacking. Students will maintain network security and take on the role of IT administrators, develop a written disaster recovery plan, and develop a written preventive maintenance plan. | (9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:  (A) describe potential security threats to information systems;  (B) identify the range of security needs and the problems that can occur due to security lapses;  (C) develop and implement plans to address security threats;  (D) document security procedures; and  (E) describe the use of computer forensics in countering security threats such as IT crimes and security breaches.  (11) The student demonstrates and applies knowledge of security risks and safeguards. The student is expected to:  (A) install security software;  (B) update security software; and  (C) use security software to clean an infected machine.  (12) The student provides support to computer users to maintain service. The student is expected to:  (A) develop a written disaster recovery plan; and  (B) develop a written preventive maintenance plan. | |
| **Section 6: Employability Portfolios and Interview Skills**  During their practicum experience, students will use appropriate technology and/or assigned materials to create, maintain, and present an employment portfolio as well as a resume. Students will demonstrate effective communications skills as they present their portfolio and resume as well as illustrate interview skills in a real or mock interview. | (2) The student identifies various employment opportunities in the IT field. The student is expected to:  (A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals;  (B) develop a resume appropriate to a chosen career plan, including letters of recommendation; and  (C) illustrate interview skills for successful job placement.  (13) The student creates a personal portfolio. The student is expected to:  (A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications;  (B) organize and prioritize information within the portfolio; and  (C) use written, verbal, and visual communication techniques consistent with IT industry standards. | |
| **Extended Practicum Plan** | **TEKS Covered**  **130.313. (c) Knowledge and Skills** | |
| **Section 1: Pre-Practicum**  Prior to beginning practicums, students will review and discuss professional standards and employers’ expectations, personal and workplace safety, proper safety and sanitation practices, effective problem-solving strategies, positive interpersonal skills, the principles of group participation and teamwork, appropriate work habits, ethical conduct, teamwork, and conflict-management skills. Students will also discuss the technical and academic skills required for the practicum, and put into place strategies for mastering any/all skills necessary to manage and perform work/practicum responsibilities. | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT;  (B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment;  (C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, regular attendance, promptness, integrity, pride in work, and customer service with increased fluency; and  (D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks. | |
| **Section 2: Customer Service and Communication Skills**  Students will engage in a supervised practicum/internship opportunity that will enhance understanding and knowledge of information technology. Students will utilize computer maintenance, networking, cyber security, and safety skills while participating in the practicum. Students will also demonstrate ethics and integrity along with professional standards and personal qualities needed to be employable, such as self-discipline, regular attendance, promptness, integrity, pride in work, and customer service.  Students will expand their knowledge base and interest in customer service through skills-based activities that are supportive of a multi-cultural perspective. Students will apply academic skills in all learning activities and apply knowledge through designs that would be represented in a technical support work environment.  Students will also review and discuss the professional, ethical, and legal responsibilities in IT as well as professional communications strategies and practices for effective working relationships, such as applying active listening skills to obtain and clarify information and exhibiting public relations skills to maintain internal and external customer/client satisfaction. | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT;  (B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment;  (C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, regular attendance, promptness, integrity, pride in work, and customer service with increased fluency.  (2) The student applies professional communications strategies. The student is expected to:  (A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency;  (B) analyze, interpret, and effectively communicate information;  (C) apply active listening skills to obtain and clarify information; and  (D) exhibit public relations skills to maintain internal and external customer/client satisfaction.  (5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:  (A) demonstrate a positive, productive work ethic by performing assigned tasks as directed;  (B) describe and practice ethical and legal responsibilities associated with the field of IT;  (C) show integrity by choosing the ethical course of action when making decisions; and  (D) comply with all applicable rules, laws, and regulations in a consistent manner. | |
| **Section 3: Information Technology Workplace Skills**  Students will discuss and demonstrate critical-thinking and problem-solving skills as they participate in check-ins with supervisors throughout their practicum experiences. Students will analyze and evaluate their practicum experiences as they describe how they have applied critical-thinking and problem-solving skills, and alternative solutions to possible problems they have encountered thus far or may still encounter.    Students will continue to engage in opportunities and technical activities that will enhance the understanding and knowledge of information technology workplace skills. Students will synthesize and demonstrate knowledge of computer maintenance and safety, networking, and cyber security into employability scenarios in the IT industry. | (3) The student implements advanced problem-solving methods. The student is expected to employ critical-thinking skills with increased fluency both independently and in groups to solve problems and make decisions.  (4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:  (A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures;  (B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine;  (C) identify the range of security needs and the problems that can occur due to security lapses with increased proficiency;  (D) demonstrate safe use of computer technology equipment such as hand and power tools with increased proficiency; and  (E) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies in a consistent manner.  (D) comply with all applicable rules, laws, and regulations in a consistent manner. | |
| **Section 4: Practicum Culminating Activities**  During their practicum experience, students will use appropriate technology and/or assigned materials to document and evaluate their practicum learning activities.  In a culminating project for the practicum, students will demonstrate professional communications skills as they present their evaluations, projects, and representative work samples to their supervising instructor. | (6) The student participates in a supervised IT experience. The student is expected to:  (A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience;  (B) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins with increased fluency;  (C) employ available reference tools, materials, and Internet sources with increased fluency to access information as needed;  (D) develop solutions using appropriate technologies, IT concepts, and IT industry standards with increased proficiency;  (E) implement project methodologies to manage information system projects; and  (F) collect representative work samples. | |