

**NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND
TRAINING**



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PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: SOFTWARE ENGINEERING TECHNICIAN

LEVEL: NTA 6

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ABBREVIATIONS

CBET	Competency Based Education and Training
CSS	Cascading Style Sheets
DCL	Data Control Language
DDL	Data Definition Language
DIV	DIVision
DML	Data Manipulation Language
DQL	Data Query Language
HTML	Hypertext Markup Language
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
JDK	Java Development Kit
LVM	Logical Volume Management
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
RAM	Random Access Memory

RAID	Redundant Array of Independent Disks
RPM	Redhat Package Manager
SQL	Structured Query Language
TCP	Transmission Control Protocol
TET	Technical Education and Training
TPS	Transactions Per Second
TVET	Technical and Vocational Education and Training
UI	User Interface
UML	Unified Modelling Language
URL	Uniform Resource Locator
WEB	World Wide Web

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.

Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs troubleshooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to the demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Software Engineering Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as Appendix 1 to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. On-the-job Software Engineers, and experienced Software Engineering Technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ... online surveys were completed by experts from the labour market across the country. Apart from the surveys aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR SOFTWARE ENGINEERING TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by a Software Engineering Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Software Engineering Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in AI software development, other individuals may be employed or designated to perform specific tasks.

The Software Engineering Technicians shall conduct computer software research, demand analysis, design, coding, testing, maintenance, management and other tasks under the supervision of Software Engineers. Generally, the Software Engineering Technician performs the following responsibilities:

- a) Operation of office software
- b) Installation of the Linux operating system
- c) Installation, update and deletion of Linux software
- d) Construct Web server environment in the Linux system
- e) Writing Linux Shell script for automation
- f) Design of responsive webpage layout
- g) Use of CCS to beautify the webpage layout
- h) Writing webpage interaction script using JavaScript
- i) Use of CSS and JS frameworks for Web front-end development
- j) Programming HTML5 page
- k) Construct small-scale local area network
- l) Troubleshooting network faults
- m) Design of database
- n) Programming and optimizing SQL language
- o) Developing dynamic website

- p) Programming using the object-oriented concept
- q) Programming and managing software development documents
- r) Conducting function test, automation test and performance test of the website using testing tools or by coding

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR SOFTWARE ENGINEERING TECHNICIAN - NTA 6

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	REALIZATION OF WEB FRONT AND BACK-END INTERACTION	DUTY NO.	601
TASK TITLE	SELECTION OF WEB DATA INTERACTION METHOD	TASK NO.	6011
PERFORMANCE CRITERIA	The person performing this task must be able to select the appropriate Web data interaction method in accordance with the business requirements.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Sniffer pro; 3. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Acquire the requirements; 2. Analyse the requirements; 3. Determine the data format; 4. Determine the interface; 5. Determine the Web data interaction method.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Acquire and analyse the requirements; 1.2 Analyse the front and back-end interaction data via sniffer pro; 1.3 Determine the Web data interaction method. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Specifications for front and back-end data interaction; 2.2 Principles of network communication; 2.3 Working principles of network connection. 3.0 Theories The person performing this task must be able to explain the following:	

	3.1 Steps of web page loading; 3.2 Characteristics of hypertext markup languages; 3.3 Working mode of the hyper text transfer protocol (HTTP). 4.0 Essential Skills 4.1 Communication skills; 4.2 Problem analysis and positioning skills; 4.3 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Appropriate interaction techniques for front and back-end data are selected in accordance with the interaction requirements of front-end pages and background data.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Data interaction specifications and precautions; 2. Scope of duties; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	REALIZATION OF WEB FRONT AND BACK-END INTERACTION	DUTY NO.	601
TASK TITLE	ACCESS TO THE NETWORK VIA HTTP	TASK NO.	6012
PERFORMANCE CRITERIA	The person performing this task must be able to write programs to access the network for back-end data using HTTP.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Object-oriented program development software; 4. JDK.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Construct the object-oriented program development environment; 2. Create project; 3. Construct the runtime environment for webpage integrated development; 4. Write code to access the network; 5. Execute code to access the network; 6. Display the acquired back-end data.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install the object-oriented program development software; 1.2 Create object-oriented projects; 1.3 Write object-oriented code; 1.4 Display data. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of HTTP. 3.0 Theories The person performing this task must be able to explain the following: 3.1 HTTP message structure; 3.2 HTTP communication process; 3.3 HTTP request methods; 3.4 HTTP status codes.	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The program is written to access the network for back-end data via HTTP in accordance with the interaction requirements of front-end pages and background data.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Specifications and precautions for code development; 2. Scope of duties; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	REALIZATION OF WEB FRONT AND BACK-END INTERACTION	DUTY NO.	601
TASK TITLE	ACQUISITION OF BACK-END DATA USING AJAX AND IFRAME	TASK NO.	6013
PERFORMANCE CRITERIA	The person performing this task must be able to update parts of the webpage without having to reload the entire page.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Javascript.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Construct the Javascript development environment; 2. Create the XMLHttpRequest object; 3. Send AJAX requests to the server; 4. Process the server response; 5. Display the acquired back-end data; 6. Achieve iframe layout on the webpage; 7. Achieve the refresh-free form of iframe.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install Javascript; 1.2 Write and send AJAX request code; 1.3 Process server responses and acquire data; 1.4 Construct and lay out the page containing iframe. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Asynchronous communication principles; 2.2 Working principles of AJAX; 2.3 Working principles of iframe. 3.0 Theories The person performing this task must be able to explain the following: 3.1 XMLHttpRequest object structure; 3.3 Format of XML data transformation;	

	3.2 Structure of the document object model; 3.3 CSS pattern; 3.4 Iframe spanning. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	JavaScript scripts are written and AJAX or iframe technology is applied to exchange data with the server in accordance with business requirements, enabling the webpage to be updated without refreshes.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Specifications and precautions for code development; 2. Scope of duties; 3. Security and vulnerability; 4. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	REALIZATION OF WEB FRONT AND BACK-END INTERACTION	DUTY NO.	601
TASK TITLE	PAGE PERFORMANCE OPTIMIZATION CODE WRITING	TASK NO.	6014
PERFORMANCE CRITERIA	The person performing this task must be able to use Cookie, write page performance optimization code, and reduce the pressure on the server.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Javascript development software.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Create Cookie; 2. Use Cookie; 3. Destroy Cookie; 4. Optimize the performance of application pages; 5. Reduce the number of HTTP requests; 6. Separate static resources from dynamic resources.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install Javascript; 1.2 Write code to save user information. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Cookie principles. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Stateless protocol; 3.2 Browser caching; 3.3 Static resources; 3.4 Dynamic resources. 4.0 Essential Skills 4.1 Communication skills;	

	4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Front and back-end data interaction code that optimizes page performance is written in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Specifications and precautions for code development; 2. Scope of duties; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	REALIZATION OF WEB FRONT AND BACK-END INTERACTION	DUTY NO.	601
TASK TITLE	ACQUISITION OF BACK-END DATA USING WEBSOCKET	TASK NO.	6015
PERFORMANCE CRITERIA	The person performing this task must be able to send data from the front end and acquire data from the back end using Socket.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Javascript.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Realize Socket server-side using the programming language; 2. Realize Socket client-side using JQuery; 3. Realize two-way data exchange using WebSocket.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install Javascript; 1.2 Create methods for Socket; 1.3 Create methods for persistent connections to exchange data. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Communication mechanism; 2.2 Working Principle of Communication; 3.0 Theories The person performing this task must be able to explain the following: 3.1 Server-side function; 3.2 Persistent connection; 3.4 Network port.	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Socket server-side and client-side scripts are written to enable two-way data interaction in accordance with business requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Specifications and precautions for code development; 2. Scope of duties; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MOBILE WEB FRONT-END DEVELOPMENT	DUTY NO.	602
TASK TITLE	MOBILE WEB APPLICATION DEVELOPMENT USING HTML5	TASK NO.	6021
PERFORMANCE CRITERIA	The person performing this task must be able to develop a complete mobile Web application using HTML5.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. HTML5 development tools; 4. Mobile browsers.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Store data using the sessionStorage; 2. Store data using the localStorage; 3. Handle Web Storage monitoring events; 4. Develop video and audio playback pages using audio and video tags; 5. Draw graphs using canvas; 6. Acquire the current geographic location using HTML5; 7. Use map to display the current geographic location; 8. Realize object dragging using HTML5; 9. Manipulate files using HTML5.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install HTML5 development tools; 1.2 Write HTML5 code to save data; 1.3 Write HTML5 code to play audio and video; 1.4 Write HTML5 code to display the current location; 1.5 Write HTML5 code to manipulate files. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of mobile Web offline application; 2.2 Working principles of mobile browsers. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Syntax specifications of HTML5;	

	3.2 New features of HTML5; 3.3 Web Storage event monitoring. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A complete HTML5-based mobile Web application is developed by the person performing this task.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MOBILE WEB FRONT-END DEVELOPMENT	DUTY NO.	602
TASK TITLE	CROSS-PLATFORM MOBILE WEB APPLICATION DEVELOPMENT	TASK NO.	6022
PERFORMANCE CRITERIA	The person performing this task must be able to design and develop a complete cross-platform mobile web application.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. HTML5 development tools; 4. Mobile browsers.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Write fluid layout pages; 2. Handle Touch events on the mobile-side; 3. Implement responsive layout containers using media queries; 4. Realize grid system and Flexbox layout.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install HTML5 development tools; 1.2 Set up the mobile page viewport; 1.3 Control the delay of click events on the mobile-side; 1.4 Set up commonly-used properties of the Flexbox. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of cross-platform mobile Web; 2.2 Working principles of viewports. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Layout viewports;	

	3.2 Visual viewports; 3.3 Responsive Web design. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A complete cross-platform mobile Web application is developed and designed by the person performing this task.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	WEB APPLICATION SOFTWARE TESTING	DUTY NO.	603
TASK TITLE	TESTING ENVIRONMENT CONSTRUCTION AND CONFIGURATION	TASK NO.	6031
PERFORMANCE CRITERIA	The person performing this task must be able to construct and configure the Web application software testing environment in accordance with the testing business requirements.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Software testing tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Select and collect software in the testing environment in accordance with the testing requirements (plan); 2. Install the operating system required for the testing environment; 3. Install the tools or software required for the testing environment; 4. Configure the tools or software required for the testing environment; 5. Verify the proper operation of the testing environment.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Select testing tools in accordance with technical requirements; 1.2 Construct and configure the testing environment; 1.3 Verify the testing environment using testing data. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Testing environment; 2.2 Hardware environment; 2.3 Software environment; 2.4 Construction of testing environment principles. 3.0 Theories	

	The person performing this task must be able to explain the following: 3.1 Testing environment construction and configuration; 3.2 Construction and configuration of the automation testing environment; 3.3 Construction and configuration of the sniffer pro environment; 3.4 Construction and configuration of the performance testing environment. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A functioning Web application software testing environment is constructed by the person performing this task in accordance with the testing business requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Software testing specifications; 2. Intellectual property protection; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	WEB APPLICATION SOFTWARE TESTING	DUTY TITLE	603
TASK TITLE	SOFTWARE FUNCTIONAL TESTING	TASK NO.	6032
PERFORMANCE CRITERIA	The person performing this task must be able to perform functional testing of the software system in accordance with the functional test cases.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Software testing tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Analyse functional requirements; 2. Design function test cases; 3. Execute function test cases; 4. Write test documents.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Analyse user interface; 1.2 Analyse service logic; 1.3 Write and apply test cases. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of function test; 2.2 Principles of designing test cases. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Prototype graph; 3.2 Test case elements; 3.3 Defect elements; 3.4 Equivalence classes; 3.5 Cause and effect diagram/ decision-making table method.	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Functional tests are completed by the person performing this task and test reports are produced in accordance with the test business requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Software testing specifications; 2. Intellectual property protection; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	WEB APPLICATION SOFTWARE TESTING	DUTY TITLE	603
TASK TITLE	AUTOMATION TEST	TASK NO.	6033
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the automation test of the software system in accordance with the software testing requirements.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Automation test tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Determine the scope of the automation test; 2. Design the functional points of the automation test; 3. Design the automation test cases; 4. Write the automation test scripts; 5. Carry out the automation test scripts and debug them; 6. Write test documents.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Analyse software interaction patterns; 1.2 Implement the automated operations such as browser opening, jumping, positioning elements, mouse operations, file uploads, etc.; 1.3 Implement defect tracking and perform regression testing. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of designing automation test cases; 2.2 Working principles of automation test. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Automation test models;	

	3.2 Interaction patterns; 3.3 Basic ways of positioning page elements. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Automation tests are completed by the person performing this task and test reports are produced in accordance with the test business requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Software testing specifications; 2. Intellectual property protection; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	WEB APPLICATION SOFTWARE TESTING	DUTY TITLE	603
TASK TITLE	PERFORMANCE TEST	TASK NO.	6034
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the software systematicness performance test in accordance with software testing requirements.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Office software; 3. Performance test tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Determine the performance test points; 2. Determine the performance test indicators; 3. Design the performance test scenarios; 4. Design the performance test plan; 5. Carry out the performance test plan; 6. Analyse the performance test results; 7. Write the performance test report.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Analyse software performance indicators; 1.2 Use performance test tools; 1.3 Perform browser interactions and design scripts; 1.4 Perform normal pressure testing. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of designing performance test plans; 2.2 Working principles of the performance test. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Performance test points; 3.2 Performance test scenarios; 3.3 Response time;	

	3.4 Numbers of concurrent users. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Functional tests are completed by the person performing this task and test reports are produced in accordance with the test business requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Software testing specifications; 2. Intellectual property protection; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DYNAMIC WEBSITE DEVELOPMENT	DUTY TITLE	604
TASK TITLE	WEB DEVELOPMENT ENVIRONMENT CONSTRUCTION	TASK NO.	6041
PERFORMANCE CRITERIA	The person performing this task must be able to construct the website development and running environment in accordance with the technical selection of the website.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Database management system; 4. Program code editing software; 5. Programming operating environment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select appropriate tools and devices according to the technical selection of the website development; 3. Install the integrated development tools for dynamic websites, including the server, database, JDK and other integrated tools; 4. Install the code editor; 5. Configure the server port number and virtual directory; 6. Write the script code, configure the operating path, and test whether it runs properly.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install the software; 1.2 Configure the running environment. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of the server; 2.2 Working principles of Web. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Basic syntax of dynamic website scripts; 3.2 Execution procedures of the script; 3.3 B/S structure; 3.4 Working principles of MPPT.	

	4.0 Essential Skills 4.1 Document editing skills; 4.2 Logical thinking skills; 4.3 Problem analysis and problem solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The website development and running environments are constructed in accordance with the technical selection of the website.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Specifications of network port usage; 2. Occupational health and safety; 3. Software installation specification.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEVELOPMENT OF DYNAMIC WEBSITE	DUTY NO.	604
TASK TITLE	DEVELOPMENT OF DATABASE INTERACTION CLASSES	TASK NO.	6042
PERFORMANCE CRITERIA	The person performing this task must be able to develop a database interaction class in accordance with the requirements of the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Database management system; 4. Program code editing software; 5. Programming operating environment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Install the integrated development tools for dynamic websites, including the server, database, JDK and other integrated tools; 3. Install the code editor; 4. Use the database in scripting languages to access APIs to encapsulate database access classes; 5. Write SQL statements, debug problems encountered in data interaction, and fix incorrect code; 6. Optimize the database access process of the website.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Connect the database; 1.2 Execute SQL statements; 1.3 Close the database connection. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Object-oriented; 2.2 SQL principles; 2.3 Development mode; 2.4 Database interaction principles. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Use of program scripts to connect to databases and set the coding format for	

	database connections; 3.2 Use of program scripts to connect to, and execute SQL statements related to database operations; 3.3 Use of database manipulation function to process query result sets into two-dimensional arrays; 3.4 Closing of database connections; 3.5 Use of database manipulation function API to encapsulate a database access class; 3.6 Designing of database access classes for the singleton pattern. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	A database interaction class is developed in accordance with the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Database technology; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DYNAMIC WEBSITE DEVELOPMENT	DUTY NO.	604
TASK TITLE	WEBSITE FUNCTIONAL MODULE DEVELOPMENT	TASK NO.	6043
PERFORMANCE CRITERIA	The person performing this task must be able to develop the functional modules of the website in accordance with the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Database management system. 4. Program code editing software; 5. Programming operating environment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Install the integrated development tools for dynamic websites, including the server, database, JDK and other integrated tools; 3. Install the code editor; 4. Develop the data submission function by designing forms according to the functional requirements; 5. Complete the list display of data by writing code according to the functional requirements; 6. Develop the permission management function of the website according to the functional requirements of the website; 7. Complete the deletion and modification of information according to the functional requirements of the website; 8. Develop the detailed view function according to the functional requirements of		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Transfer data using forms; 1.2 Display data using lists; 1.3 Perform the authority control. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Function; 2.2 Form value passing; 2.3 Session variable. 3.0 Theories The person performing this task must be able to explain the following: 3.1. Basic script syntax; 3.2 Commonly-used form elements;	

the website; 9. Debug the running code and fix the wrong code.	3.3 Form property setting; 3.4 Form value passing; 3.5 Session variable; 3.6 File operation; 3.7 Image operation. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The person performing this task must be able to develop the functional modules of the website in accordance with the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Database technology; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	RESPONSIVE WEBSITE DEVELOPMENT	DUTY NO.	605
TASK TITLE	RESPONSIVE PAGE LAYOUT DEVELOPMENT	TASK NO.	6051
PERFORMANCE CRITERIA	The person performing this task must be able to develop the responsive page layout of the website in accordance with the requirements of the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Program code editing software; 4. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable CSS framework for the task; 3. Select a suitable code editing software; Install the code editing software; 4. Construct the page layout design environment; 5. Cite the CSS framework; 6. Design the website layout according to the requirements of the website; 7. Develop the responsive page layout; 8. Debug the layout effect using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Develop the responsive page layout; 1.2 Test layout effects using browsers. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Grid system; 2.2 Responsive layout; 2.3 Media Inquiry. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Grid system in the layout; 3.2 Media Inquiry; 3.3 Grid option; 3.4 Basic grid structure;	

	3.5 Responsive column reset; 3.6 Offset column; 3.7 Nested column; 3.8 Column sorting. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The responsive layout page of the website is developed in accordance with the requirements of the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	RESPONSIVE WEBSITE DEVELOPMENT	DUTY NO.	605
TASK TITLE	WEBPAGE INTERFACE BEAUTIFICATION	TASK NO.	6052
PERFORMANCE CRITERIA	The person performing this task must be able to beautify the webpage interface using CSS framework techniques in accordance with the requirements of the website design instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Program code editing software; 4. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable CSS framework for the task; 3. Select a suitable code editing software; Install the code editor; 4. Construct a webpage interface development environment; 5. Cite the CSS framework in the page; 6. Beautify the webpage table, form, button, image, text, etc.; 7. Design button groups, button drop-down menus, input box groups using the CSS framework; 8. Design the navigation menu; 9. Beautify panels, list groups, paging, multimedia objects in the webpage; 10. Debug the beautification effect of webpages using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Beautify the webpage interface; 1.2 Test webpage effects using browsers. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of CSS framework. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Font icon; 3.2 Application of table, form, button, and image styles in the CSS framework; 3.3 Invocation of button groups, button drop-down menus, and input box groups in the CSS framework; 3.4 Navigation menus in the CSS framework;	

	3.5 Invocation of panels, list groups, paging and other styles in the CSS framework; 3.6 Application of multimedia objects. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	CSS framework techniques are utilized to beautify the webpage interface in accordance with the requirements of the webpage design instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	RESPONSIVE WEBSITE DEVELOPMENT	DUTY NO.	605
TASK TITLE	WEBPAGE INTERACTION OPTIMIZATION	TASK NO.	6053
PERFORMANCE CRITERIA	The person performing this task must be able to optimize the webpage interactions using the plug-ins in the CSS framework in accordance with the requirements of the website design instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. WEB server software; 3. Program code editing software; 4. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable CSS framework for the task; 3. Select a suitable code editing software; Install the code editor; 4. Construct the page design environment; 5. Cite the CSS framework in the page; 6. Select appropriate plug-ins, develop website interface modules and optimize interactive effects in accordance with the requirements of the website design instruction; 7. Debug the webpage effect using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Invoke the CSS framework plug-in; 1.2 Test webpage effects using browsers. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of the CSS framework plug-in; 2.2 Working principles of the interactive page. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Application of transition effects in CSS frameworks; 3.2 Application of modal boxes in CSS frameworks;	

	3.3 Application of drop-down menus in CSS frameworks; 3.4 Application of scroll monitoring in CSS frameworks; 3.5 Application of tabs in CSS frameworks; 3.6 Application of cluetips in CSS frameworks; 3.7 Application of pop-up boxes in CSS frameworks; 3.8 Application of warning boxes in CSS frameworks; 3.9 Application of buttons in CSS frameworks; 3.10 Application of folding functions in CSS frameworks; 3.11 Application of carousel in CSS frameworks; 3.12 Application of additional navigation in CSS frameworks. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The plug-ins in the CSS framework are utilized to develop interactive webpages in accordance with the requirements of the website design instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INTERACTIVE WEBSITE DEVELOPMENT	DUTY NO.	606
TASK TITLE	WEBSITE FRONT-END FUNCTION DEVELOPMENT	TASK NO.	6061
PERFORMANCE CRITERIA	The person performing this task must be able to develop the front-end functional module of the website using the JS library in accordance with the requirements of the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Program code editing software; 3. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable JS framework for the task; 3. Select a suitable code editing software; Install the code editor; 4. Construct a webpage front-end development environment; 5. Cite the JS framework in the page; 6. Develop the front-end functional module using JS plug-ins in accordance with the requirements of the website design instruction; 7. Debug the webpage effect using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Invoke the JS library; 1.2 Operate the DOM using the JS library; 1.3 Test the webpage effect using the browser. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 DOM principles; 2.2 Working principles of JS library selectors. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Commonly-used DOM element selector; 3.2 Methods for reading the content of HTML elements; 3.3 Methods for setting attributes of HTML elements;	

	3.4 Methods for adding HTML elements; 3.5 Methods for deleting HTML elements; 3.6 Settings of CSS classes of HTML elements. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The JS library is utilized to develop the front-end functional module of the website in accordance with the requirements of the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INTERACTIVE WEBSITE DEVELOPMENT	DUTY NO.	606
TASK TITLE	WEBPAGE ANIMATION AND SPECIAL EFFECTS DEVELOPMENT	TASK NO.	6062
PERFORMANCE CRITERIA	The person performing this task must be able to develop the webpage animation and special effects using the JS library in accordance with the requirements of the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Program code editing software; 3. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable JS framework for the task; 3. Select a suitable code editing software; Install the code editor; 4. Construct a webpage front-end development environment; 5. Cite the JS framework in the page; 6. Develop the webpage animation and special effects using JS plug-ins in accordance with the requirements of the website design instruction; 7. Debug the webpage effect using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Invoke the JS library; 1.2 Develop the animation and special effects using the JS library; 1.3 Test webpage effects using browsers. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of JS animation; 2.2 Working principles of JS special effects. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Methods of showing and hiding HTML elements; 3.2 Methods of fade-in and fade-out of HTML elements;	

	3.3 Methods for sliding up and down of HTML elements; 3.4 Custom animation creation; 3.5 Control methods for custom animations; 3.6 Clearance of the specified animation of the element. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The JS library is utilized to develop the webpage animation and special effects in accordance with the requirements of the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

OCCUPATION	SOFTWARE ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INTERACTIVE WEBSITE DEVELOPMENT	DUTY NO.	606
TASK TITLE	INTERACTIVE WEBPAGE DEVELOPMENT	TASK NO.	6063
PERFORMANCE CRITERIA	The person performing this task must be able to develop interactive webpages using the JS library's event methods in accordance with the requirements of the website requirements instruction.		
RANGE STATEMENT	The task can be performed in the machine room under the supervision of software engineers. The tools and equipment to be used include: 1. Computers; 2. Program code editing software; 3. Browser.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe computer safety operating procedures when performing tasks; 2. Select a suitable JS framework for the task; 3. Select a suitable code editing software; Install the code editor; 4. Construct a webpage front-end development environment; 5. Cite the JS framework in the page; 6. Develop interactive webpages using JS event methods in accordance with the requirements of the website design instruction; 7. Debug the webpage effect using the browser and fix the problems encountered.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Invoke the event method in the JS library; 1.2 Develop the page interactive function. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of events in the JS library; 2.2 Working principles of DOM events. 3.0 Theories The person performing this task must be able to explain the following: 3.1 The syntax of event methods in the JS library; 3.2 The mouse event methods in the JS library; 3.3 The keyboard event methods in the JS library;	

	3.4 The form event methods in the JS library; 3.5 The document/window event methods in the JS library; 3.6 The ready() event of a document. 4.0 Essential Skills 4.1 Communication skills; 4.2 Document writing skills; 4.3 Problem analysis and positioning skills; 4.4 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The JS library's event methods are utilized to develop interactive webpages in accordance with the requirements of the website requirements instruction.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Code development specifications; 2. Webpage design specifications; 3. Occupational health and safety.

TABLE 1: DACUM CHARTS FOR SOFTWARE ENGINEERING TECHNICIAN – NTA 6

DUTIES	TASKS	ENABLERS
1.0 Realization of web front and back-end interaction	1.1 Selection of web data interaction method.	General skills and knowledge • Concept and message structure of HTTP • Communication process of HTTP • Common status code of HTTP • Working principles of asynchronous communication by means of AJAX • The process of implementing asynchronous communication with iframe • Realization of page asynchronous communication using AJAX and iframe respectively • The creation, use and destruction of Cookie • Page optimization methods • Communication mechanism and communication process of Socket • Expression skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above • Hard disk with a capacity of 500GB and above Materials • Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related frameworks Requirements for employees • Teamwork spirit • Integrity • Time management
	1.2 Access to the network via http.	
	1.3 Realization of Web front and back-end interaction.	
	1.4 Page performance optimization code writing.	
	1.5 Acquisition of back-end data using websocket.	

2.0 Mobile web front-end development	2.1 Mobile web application development using HTML5.	General skills and knowledge • Web browser on the mobile-side • HTML5-based mobile Web development • HTML5 network storage • Mobile Web offline application • Methods of using localStorage and sessionStorage • Methods of using Application Cache • Methods of drawing graphics on canvas • Usage of <video> tag and <audio> tag • Use of Geolocation API • Dragging operations in HTML5 • File operations • Fluid layout • Three viewports on the mobile-side • Methods of setting layout viewports using <meta> tags • Methods of using Touch events • Methods of using transition and end-of-animation events • Communication and writing skills • Problem solving skills • Excellent interpersonal skills • Expression skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above • Hard disk with a capacity of 500GB and above Materials • Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related
	2.2 Cross-platform mobile Web application development.	

		frameworks Requirements for employees • Teamwork spirit • Integrity • Time management
3.0 Web application software testing	3.1 Testing environment construction and configuration.	General skills and knowledge • Construction and configuration of the testing environment • Construction and configuration of the automation testing environment • Construction and configuration of the sniffer pro environment • Construction and configuration of the performance testing environment • Construction and configuration of the interface testing environment • Analysis of functional requirements • Design and implementation of the function test cases • Demand analysis of the automation test • Case design of the automation test • Design and implementation of the automation test scripts • Demand analysis of performance test • Implementation of performance test • Result analysis of performance test • Interface document analysis • Case design of interface testing • Implementation of interface testing • Test document handling skills • Problem solving skills • Verbal expression skills • Teamwork skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above
	3.2 Software functional testing software	
	3.3 Automation test.	
	3.4 Performance test.	

		• Hard disk with a capacity of 500GB and above Materials • Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related frameworks Requirements for employees • Teamwork spirit • Integrity • Time management
4.0 Dynamic website development	4.1 Web development environment construction.	General skills and knowledge • Basic syntax of webpage scripts • Process-oriented programming and development • File operations • Database interaction • Web page interaction • Graphics and image processing • Program code abstraction and encapsulation skills • Program code specification skills • Program debugging and problem handling skills • Excellent interpersonal skills • Expression skills • Document management skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above • Hard disk with a capacity of 500GB and above Materials
	4.2 Development of database interaction classes.	
	4.3 Website functional module development.	

		• Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related frameworks Requirements for employees • Teamwork spirit • Integrity • Time management
5.0 Responsive website development	5.1 Responsive page layout development.	General skills and knowledge • Working principles of the grid system • Media Inquiry • Invocation of CSS framework styles • Responsive layout design • Font icon • Layout component • Framework plug-in • Communication and writing skills • Problem solving skills • Excellent interpersonal skills • Expression skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above • Hard disk with a capacity of 500GB and above Materials • Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related frameworks Requirements for employees
	5.2 Webpage interface beautification.	
	5.3 Webpage interaction optimization.	

		• Teamwork spirit • Integrity • Time management
6.0 Interactive website development	6.1 Website front-end function development.	General skills and knowledge • Basic syntax of jQuery • jQuery event • jQuery selector • jQuery selector • Animation and special effects of jQuery • Application of Ajax in jQuery • jQuery plug-in • jQuery UI plug-in • Problem solving skills • Verbal expression skills • Teamwork skills Tools and equipment • Intel I5 and higher level processors • Memory of 8GB and above • Hard disk with a capacity of 500GB and above Materials • Commonly-used operating systems such as Windows, Mac and Linux • A variety of virtual machine environment • Development tools and related frameworks Requirements for employees • Teamwork spirit • Integrity • Time management
	6.2 Webpage animation and special effects development.	
	6.3 Interactive webpage development.	