Model Curriculum

QP Name: Software Programmer

QP Code: SSC/Q0510

QP Version: 1.0

NSQF Level: 4

Model Curriculum Version: 1.0

IT-ITeS Sector Skills Council NASSCOM | Plot No – 7,8,9 & 10, Sector 126, Noida, UP.
Pin code: 201303

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Training Parameters

Sector	**IT-ITeS**
Sub-Sector	**IT Services**
Occupation	**Application Development**
Country	**India**
NSQF Level	**4**
Aligned to NCO/ISCO/ISIC Code	**NCO-2015/2512.0100**
Minimum Educational Qualification and Experience	*Relevant Experience: Experience in Programming languages (Such as Python, HTML, CSS, Javascript etc.) The relevant experience would include work, internship, and apprenticeship after completing relevant educational qualifications. 12th Grade Pass with computer background OR 10th Grade Pass with 2 Years of relevant experience* OR Previous Relevant qualification of NSQF level 3 with 3 years of relevant experience*
Pre-Requisite License or Training	**NA**
Minimum Job Entry Age	**16 years**
Last Reviewed On	**November 17, 2022**
Next Review Date	**November 17, 2025**
NSQC Approval Date	**November 17, 2022**
QP Version	**1.0**
Model Curriculum Creation Date	**November 17, 2022**
Model Curriculum Valid Up to Date	**November 17, 2025**
Model Curriculum Version	**1.0**
Minimum Duration of the Course	**390 hours (Including 1 elective)**
Maximum Duration of the Course	**Varies depending on the no. of electives chosen by the learner**

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

Compulsory:

- Design algorithms to solve problems and execute test cases to convert them into code.
- Understand software development lifecycle and software design specifications.
- Demonstrate interpersonal skills, digital and financial skills, and work ethic.

Elective-1: Java Programming

- Understand the basics of Java programming
- Explain the concepts of data structures in Java and use databases in Java programming
- Develop software code using core Java programming
- Execute, test, and debug the Java program

Elective-2: Python Programming

- Understand the basics of Python programming
- Explain the concepts of data structures in Python and use databases in Python programming
- Develop software code using core Python programming
- Execute, test, and debug the Python program

Elective-3: HTML5 Programming

- Understand the basics of HTML5 programming
- Develop web pages and web/mobile apps using HTML5 in conjunction with JavaScript, CSS, etc.

Compulsory Modules

The table lists the modules and their Duration (In Hours) corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration (In Hours)	Practical Duration (In Hours)	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration (In Hours)
SSC/N0509: Verify the specifications and contribute to the design of software program NOS Version No. 1 NSQF Level 4	**36:00**	**24:00**	**00:00**	**00:00**	**60:00**
Module 1: Introduction to programming and algorithms	18:00	12:00	00:00	00:00	30:00
Module 2: Analysis and design of software applications	18:00	12:00	00:00	00:00	30:00

DGT/VSQ/N0102: Employability Skill 60 Hours NSQF Level 4	**24:00**	**36:00**	**00:00**	**00:00**	**60:00**
Module 3: Introduction to Employability Skills	01:50	00:00	00:00	00:00	01.50
Module 4: Constitutional values - Citizenship	01:50	00:00	00:00	00:00	01.50
Module 5: Becoming a Professional in the 21st Century	02:50	00:00	00:00	00:00	02:50
Module 6: Basic English Skills	05:00	05:00	00:00	00:00	10:00
Module 7: Career Development & Goal Setting	01:00	01:00	00:00	00:00	02:00
Module 8: Communication Skills	02:00	03:00	00:00	00:00	05:00
Module 9: Diversity & Inclusion	02:50	00:00	00:00	00:00	02:50
Module 10: Financial and Legal Literacy	02:00	03:00	00:00	00:00	05:00
Module 11: Essential Digital Skills	04:00	06:00	00:00	00:00	10:00
Module 12: Entrepreneurship	03:00	04:00	00:00	00:00	07:00
Module 13: Customer Service	02:00	03:00	00:00	00:00	05:00
Module 14: Getting ready for apprenticeship & Jobs	03:00	05:00	00:00	00:00	08:00
Total Duration	**60:00**	**60:00**	**00:00**	**00:00**	**120:00**

Elective Module-1

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SSC/N0510: Develop, test and execute software programs as per specifications using Java NOS Version No. 1 NSQF Level 4	**60:00**	**60:00**	**00:00**	**00:00**	**120:00**
Elective module 1.1: Introduction to Java	08:00	08:00	00:00	00:00	16:00
Elective module 1.2: Introduction to data structures and databases	12:00	12:00	00:00	00:00	24:00
Elective module 1.3: Core Java Concepts	26:00	26:00	00:00	00:00	52:00
Elective module 1.4: Testing and execution	14:00	14:00	00:00	00:00	28:00
OJT	**00:00**	**00:00**	**150:00**	**00:00**	**150:00**
Total Duration	**60:00**	**60:00**	**150:00**	**00:00**	**270:00**

Elective Module-2

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SSC/N0511: Develop, test and execute software programs as per specifications using Python NOS Version No. 1 NSQF Level 4	**60:00**	**60:00**	**00:00**	**00:00**	**120:00**
Elective module 2.1: Introduction to Python	08:00	08:00	00:00	00:00	16:00
Elective module 2.2: Introduction to data structures and databases	12:00	12:00	00:00	00:00	24:00
Elective module 2.3: Core Python Concepts	26:00	26:00	00:00	00:00	52:00
Elective module 2.4: Testing and execution	14:00	14:00	00:00	00:00	28:00
OJT	**00:00**	**00:00**	**150:00**	**00:00**	**150:00**
Total Duration	**60:00**	**60:00**	**150:00**	**00:00**	**270:00**

Elective Module-3

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SSC/N0512: Write, test and execute programs in HTML5 to develop web or mobile applications as per specifications NOS Version No. 1 NSQF Level 4	**60:00**	**60:00**	**00:00**	**00:00**	**120:00**
Elective module 3.1: Concepts of HTML5	30:00	30:00	00:00	00:00	60:00
Elective module 3.2: HTML5 with CSS and JavaScript for web and mobile development	30:00	30:00	00:00	00:00	60:00
OJT	**00:00**	**00:00**	**150:00**	**00:00**	**150:00**
Total Duration	**60:00**	**60:00**	**150:00**	**00:00**	**270:00**
Total Duration including 1 Elective	**120:00**	**120:00**	**150:00**	**00:00**	**390:00**

Module Details

Module 1: Programming and Algorithms

Mapped to SSC/N0509, v1.0

Training Outcomes:

- Design algorithms to solve problems and execute test cases to convert them into code.

Duration: *18:00(In Hours)*	**Duration:** *12:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the stages of computational thinking • Explain the basics of flowcharts and logic • Describe algorithms and their significance in developing computer programs • Explain commonly used algorithms such as search, sort, hash, union-find, dynamic programming, brute force, etc. • Distinguish between objective and procedural programming • Distinguish between compiled and interpreted languages	• Demonstrate how to construct a framework for software program using flow charts and algorithms • Anlayze algorithms' performance based on runtimes • Demonstrate the difference among objective vs. procedural programming and interpreted vs compiled languages using sample codes • Explore relevant sources to gather latest updated in programming
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools	

Module 2: Analysis and Design of Software Applications

Mapped to SSC/N0510, v2.0

Training Outcomes:

- Understand software development lifecycle and software design specifications.

Duration: *18:00(In Hours)*	**Duration:** *12:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the Software Development Life Cycle encompassing Business Requirements Specification (BRS), Software Requirements Specification (SRS), High Level Design (HLD) and Low-Level Design (LLD). • List the different techniques used for Requirements Analysis. • Classify elements for measuring various aspects of software development process.	• Analyze program inputs to identify, resolve and record design process. • Examine the correct software programming procedure or prototyping paradigms using principles of code and design quality. • Review software development designs to identify any bugs, like Arithmetic, Logical, Syntax, Multithreading, etc.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Social networking tool / LMS tool to enable blog posts or discussion board, Instant messenger, chat, and email tools to enable mock exercises.	

Module 3: Introduction to Employability Skills

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Discuss the Employability Skills required for jobs in various industries
- List different learning and employability related GOI and private portals and their usage

Duration:1.5 Hours (0.5 Theory + 1 Practical)

Module 4: Constitutional values - Citizenship

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
- Show how to practice different environmentally sustainable practices

Duration:1.5 Hours (0.5 Theory + 1 Practical)

Module 5: Becoming a Professional in the 21st Century

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Discuss importance of relevant 21st century skills.
- Exhibit 21st century skills like Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
- Describe the benefits of continuous learning

Duration:2.5 Hours (1 Theory + 1.5 Practical)

Module 6: Basic English Skills

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
- Read and interpret text written in basic English
- Write a short note/paragraph / letter/e -mail using basic English

Duration: 10 Hours (4 Theory + 6 Practical)

Module 7: Career Development and Goal Setting

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Create a career development plan with well-defined short- and long-term goals

Duration: 2 Hours (1 Theory + 1 Practical)

Module 8: Communication skills

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
- Explain the importance of active listening for effective communication
- Discuss the significance of working collaboratively with others in a team

Duration: 5 Hours (2 Theory + 3 Practical)

Module 9: Diversity and Inclusion

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
- Discuss the significance of escalating sexual harassment issues as per POSH

Duration: 2.5 Hours (1 Theory+ 1.5 Practical)

Module 10: Financial and Digital Literacy

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Outline the importance of selecting the right financial institution, product, and service
- Demonstrate how to carry out offline and online financial transactions, safely and securely

Duration: 5 Hours (2 Theory+ 3 Practical)

Module 11: Essential Digital Skills

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Describe the role of digital technology in today's life
- Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
- Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely
- Create sample word documents, excel sheets and presentations using basic features
- utilize virtual collaboration tools to work effectively

Duration: 10 Hours (4 Theory+ 6 Practical)

Module 12: Entrepreneurship

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Explain the types of entrepreneurship and enterprises
- Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan

- Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
- Create a sample business plan, for the selected business opportunity

Duration: 7 Hours (3 Theory+ 4 Practical)

Module 13: Customer Service

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Describe the significance of analysing different types and needs of customers
- Explain the significance of identifying customer needs and responding to them in a professional manner.
- Discuss the significance of maintaining hygiene and dressing appropriately

Duration: 5 Hours (2 Theory+ 3 Practical)

Module 14: Getting Ready for Apprenticeship and Jobs

Mapped to DGT/VSQ/N0102 (Version No. 1)

Key Learning Outcomes:

- Create a professional Curriculum Vitae (CV)
- Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
- Discuss the significance of maintaining hygiene and confidence during an interview
- Perform a mock interview
- List the steps for searching and registering for apprenticeship opportunities

Duration: 8 Hours (3 Theory+ 5 Practical)

Elective Module 1.1: Introduction to Java

Mapped to SSC/N0510, v1.0

Training Outcomes:

- Understand the basics of Java programming.

Duration: *08:00(In Hours)*	**Duration:** *08:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Outline the evolution of programming languages • Distinguish between imperative and declarative programming paradigms • List the features of • • -oriented programming: Class, Object, Encapsulation, Abstraction, etc. • Describe the features of Java as programming language such as platform independent, multithreading, distributed, etc. • Outline the terminology used in java programming such as bytecode, JVM, JDK, JRC, etc. • Explain how Java can act as both compiled and interpreted language • List the tools used for programming in Java such as Eclipse IDE, Maven, etc..	• Demonstrate the elements of imperative programming such as variables, flow control and functions • Familiarize with the IDE to be used for java programming (e.g., Eclipse, Maven, etc.)
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Java IDE such as Eclipse, maven, etc. Java testing tools such as JUnit	

Elective Module 1.2: Introduction to data structures and databases

Mapped to SSC/N0510, v1.0

Training Outcomes:

- Explain the concepts of data structures in Java and use databases in Java programming.

Duration: *12:00(In Hours)*	**Duration:** *12:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain various datatypes, variables, operators (arithmetic, relational, logical, bitwise, etc.), strings and arrays • Explain the concepts of strings and arrays in the context of java programming • Discuss the concepts of memory allocation • Explain the concepts of relational database management system	• Create expressions, statements, and blocks in Java • Demonstrate the use of type conversions • Use arrays, strings and oprators to declare variables • Demonstrate the use of RDBMS in Java programming
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Java IDE such as Eclipse, maven, etc. Java testing tools such as JUnit	

Elective Module 1.3: Core Java Concepts

Mapped to SSC/N0510, v1.0

Training Outcomes:

- Develop software code using core Java programming.

Duration: *26:00(In Hours)*	**Duration:** *26:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss various control flow statements (if, then, while, for, nested if, etc.) in java programming • Explain the concepts and various types of methods/ functions, constructors, and class • Explain the ways to create objects in Java • Discuss key aspects of encapsulation, inheritance, abstraction, polymorphism, interfaces, and multithreading • Explain the concepts of packages and file handling in Java • Distinguish between overloading and overriding • Study the concepts of I/O channels, java streams, and APIs • Outline advanced topics and latest additions to Java such as lambda expressions, collections, generics, JDBC, etc. • Outline MVC architecture layers in Java	• Demonstrate the use of control flow statements as part of java code • Create an object from a class using suitable methods • Demonstrate the 3 steps: declaration, instantiation, and initialization • Use and create packages and interfaces in Java • Demonstrate encapsulation, inheritance, abstraction, polymorphism, interfaces and multithreading using suitable examples • Perform file operations and use I/O streams in Java • Demonstrate suitable examples for advanced topics qand latest additions to Java • Create applets in java using graphical user interface
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Java IDE such as Eclipse, maven, etc. Java testing tools such as JUnit	

Elective Module 1.4: Testing and execution

Mapped to SSC/N0510, v1.0

Training Outcomes:

- Execute, test, and debug the Java program.

Duration: *14:00(In Hours)*	**Duration:** *14:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe various frameworks/ methods used in testing a java program • Explain the steps involved in debugging a java program • Distinguish between development, stage and production environments • Explain various exceptions and exception handling methods • Discuss coding standards and best practices related to Java	• Create suitable test cases to identify bugs using suitable tools such as JUnit • Demonstrate how to debug a java program in an IDE • Demonstrate the ways to execute a java program • Implement exception handling methods in Java
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Java IDE such as Eclipse, maven, etc. Java testing tools such as JUnit	

Elective Module 2.1: Introduction to Python

Mapped to SSC/N0511, v1.0

Training Outcomes:

- Understand the basics of Python programming.

Duration: *08:00(In Hours)*	**Duration:** *08:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Outline the evolution of programming languages • Distinguish between imperative and declarative programming paradigms • List the features of object-oriented programming: Class, Object, Encapsulation, Abstraction, etc. • Describe the features of Python as programming language • Outline the terminology used in Python programming such as interpreter, lambda, loader, method, etc. • Explain how Python can act as both compiled and interpreted language • List the tools used for programming in Python such as IDLE, Jupyter etc.	• Demonstrate the elements of imperative programming such as variables, flow control and functions • Familiarize with the platforms used for Python programming (e.g., IDLE and Jupyter)
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Python IDE such as Jupyter, IDLE, etc. Python testing tools such as Pytest, Robot, etc.	

Elective Module 2.2: Introduction to data structures and databases

Mapped to SSC/N0511, v1.0

Training Outcomes:

- Explain the concepts of data structures in Python and use databases in Python programming.

Duration: *12:00(In Hours)*	**Duration:** *12:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain various core datatypes (numbers, strings, dictionaries, etc.) variables, operators (arithmetic, relational, logical, bitwise, etc.), strings and arrays in the context of python programming • Discuss the concepts of memory allocation • Explain the concepts of relational database management system	• Demonstrate the use of type conversions • Use arrays, strings, and operators to declare variables • Demonstrate the use of RDBMS in Python programming
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Python IDE such as Jupyter, IDLE, etc. Python testing tools such as Pytest, Robot, etc.	

Elective Module 2.3: Core Python Concepts

Mapped to SSC/N0511, v1.0

Training Outcomes:

- Develop software code using core Python programming.

Duration: *26:00(In Hours)*	**Duration:** *26:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the concepts, types and operations related to core Python elements such as numeric types, dynamic typing interlude, lists, dictionaries, tuples, etc. • Explain the syntax rules, assignments, iteration, and comprehensions • Discuss various control flow statements (if, then, while, for, nested if, etc.) in Python programming • Explain the concepts and various types of methods/ functions, scopes, modules and class • Explain OOP features and more advanced elements of Python such as advanced modules, class coding, operator overloading, multiple inheritance, lambda, decorators, meta classes, gotchas, managed attributes, data streams, metadata, design patterns etc.	• Demonstrate the use of control flow statements as part of Python code • Create expressions and statements to implement, core Python elements • Write sample codes to explore the OOP features and advanced elements of Python programming • Create the following: 1. python library 2. data streams access modes 3. basic python app packaging
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Python IDE such as Jupyter, IDLE, etc. Python testing tools such as Pytest, Robot, etc.	

Elective Module 2.4: Testing and execution

Mapped to SSC/N0511, v1.0

Training Outcomes:

- Execute, test, and debug the Python program.

Duration: *14:00(In Hours)*	**Duration:** *14:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe various frameworks/ methods used in testing a Python program • Explain the steps involved in debugging a Python program • Explain various exceptions and exception handling methods • Discuss coding standards and best practices related to Python	• Create suitable test cases to identify bugs in a Python program • Demonstrate how to debug a Python program • Demonstrate the ways to execute a Python app and deploy it • Implement exception handling methods in Python • Demonstrate python app deployment using Git and GitHub
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: Python IDE such as Jupyter, IDLE, etc. Python testing tools such as Pytest, Robot, etc.	

Elective Module 3.1: Concepts of HTML5

Mapped to SSC/N0512, v1.0

Training Outcomes:

- Understand the basics of HTM5 programming.

Duration: *30:00(In Hours)*	**Duration:** *30:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Distinguish between a markup language and other programming languages • Discuss the use of HTML5 along with other frameworks/ languages in frontend development (web and mobile) • Explain key components of HTML5 syntax and logic such as nesting, head elements, character sets, character encoding, links, scripts, etc. • Describe the use of HTML5 elements and attributes such as tables, forms, layouts, image and figures, video embedding, navigation, and HTML events (onblur, onchange, ondblcick, ondcanplay, etc.) • Describe the concepts of APIs in the context of HTML programming • Explain the concepts of web storage and web SQL database	• Demonstrate the implementation of HTML5 in frontend development • Demonstrate how HTML files work • Develop HTML5 codes to explore the elements and attributes of the programming language • Build APIs using HTML5 • Explore HTML5 webforms 2.0 • Demonstrate how web storage and web SQL database work
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: IDE for HTML5 development such as VisualStudio, NetBeans, etc.	

Elective Module 3.2: HTML5 with CSS and JavaScript for web and mobile development

Mapped to SSC/N0512, v1.0

Training Outcomes:

- Develop web pages and web/mobile apps using HTML5 in conjunction with JavaScript, CSS, etc.

Duration: *30:00(In Hours)*	**Duration:** *30:00(In Hours)*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the frameworks and languages used in conjunction with HTML5 for web and mobile development • Discus the types of CSS and the features of CSS3 such as multiple column layouts, advanced animations, selectors, etc. • Study the features of JavaScript (libraries, functions, operators, variable, data view, arrow functions, etc.) for generating HTML content and dynamic manipulation • Examine the features of jQuery library and its advantages	• Demonstrate how CSS is implemented in presenting a HTML document • Implement JavaScript to build interactive web pages and web and mobile apps • Explore the features of Bootstrap for adding interface components to web and mobile apps/ pages • Use jQuery library and plugins for HTML manipulation, HTML event methods, AJAX calls and DOM manipulation
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements:	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Microphone / voice system for lecture and class activities Computer Lab with 1:1 PC: trainee ratio and having internet connection, MS Office / Open office, Browser, Outlook / Any other Email Client, and chat tools Tools and programming languages: IDE for HTML5 development such as VisualStudio, NetBeans, etc.	

Annexure

Trainer Requirements

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification**: Graduate in any discipline. **Industry experience**: Minimum 2 year experience in Java/Python/HTML5 **Training experience**: Minimum 1-year experience Additional certification in specific software applications and related hardware configuration requirements.
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification**: Graduate in any discipline. **Industry experience**: Minimum 2 year experience in Java/Python/HTML5 **Training experience**: Minimum 1-year experience Additional certification in specific software applications and related hardware configuration requirements.
3.	**Tools and Equipment Required for the Training**	☒Yes ☐No *(If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, details of Any Upskilling Required for Trainer**	NA

Assessor Requirements

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification**: Graduate in any discipline. **Industry experience**: Minimum 2 years' experience in Java/Python/HTML5 **Training experience**: Minimum 1-year experience
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines), (wherever applicable)*	**Educational Qualification**: Graduate in any discipline. **Industry experience**: Minimum 2 year experience in Java/Python/HTML5 **Training experience**: Minimum 1-year experience
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Educational Qualification**: Graduate in any discipline. **Industry experience**: Minimum 2 year experience in Java/Python/HTML5 **Training experience**: Minimum 1-year experience
4.	**Assessment Mode** *(Specify the assessment mode)*	Can be either in the classroom or online
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the learner on the required competencies of the program.

Assessment System Overview

A uniform assessment of job candidates as per industry standards facilitates progress of the industry by filtering employable individuals while simultaneously providing candidates with an analysis of personal strengths and weaknesses.

Assessment Criteria

Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.

The assessment for the theory part will be based on a knowledge bank of questions created by the SSC. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

Guidelines for Assessment			
Testing Environment	**Tasks and Functions**	**Productivity**	**Teamwork**
• Carry out assessments under realistic work pressures that are found in the normal industry workplace (or simulated workplace). • Ensure that the range of materials, equipment, and tools that learners use are current and of the type routinely found in the normal industry workplace (or simulated workplace) environments.	• Assess that all tasks and functions are completed in a way, and to a timescale, that is acceptable in the normal industry workplace. • Assign workplace (or simulated workplace) responsibilities that enable learners to meet the requirements of the NOS.	• Productivity levels must be checked to ensure that it reflects those that are found in the work situation being replicated.	• Provide situations that allow learners to interact with the range of personnel and contractors found in the normal industry workplace (or simulated workplace).

Assessment Quality Assurance framework

NASSCOM provides two assessment frameworks NAC and NAC-Tech.

NAC (NASSCOM Assessment of Competence)

NAC follows a test matrix to assess Speaking & Listening, Analytical, Quantitative, Writing, and Keyboard skills of candidates appearing for assessment.

NAC-Tech

NAC-Tech test matrix includes assessment of Communication, Reading, Analytical, Logical Reasoning, Work Management, Computer Fundamentals, Operating Systems, RDBMS, SDLC, Algorithms & Programming Fundamentals, and System Architecture skills.

Methods of Validation

To pass a QF, a trainee should score a minimum aggregate of 70% across qualification. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Method of assessment documentation and access

The assessment agency will upload the result of assessment in the portal. The data will not be accessible for change by the assessment agency after the upload. The assessment data will be validated by SSC assessment team. After upload, only SSC can access this data.

References

Glossary

Term	Description
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.
National Occupational Standard	National Occupational Standard specify the standard of performance an individual must achieve when carrying out a function in the workplace
Persons With Disability	Persons with Disability are those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.
Integrated Development Environment	An integrated development environment is a software application that provides comprehensive facilities to computer programmers for software development.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SSC	Skill Sectors Councils
NASSCOM	National Association of Software & Service Companies
PwD	Persons with Disability
IDE	Integrated Development Environment