



IT - ITeS SSC
NASSCOM



Model Curriculum

QP Name: SOFTWARE DEVELOPER

QP Code: SSC/Q0501

QP Version: 2.0

NSQF Level: 7

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	7
Aligned to NCO/ISCO/ISIC Code	NCO-2015/ 2512.0204
Minimum Educational Qualification and Experience	Graduate (Computer Science or any related field) with 0-6 Months of experience
Pre-Requisite License or Training	Software Development Certifications in C++, Embedded, C#, C, Java, etc.
Minimum Job Entry Age	18 Years
Last Reviewed On	21-05-2020
Next Review Date	21-05-2025
NSQC Approval Date	TBD
QP Version	2.0
Model Curriculum Creation Date	21-05-2020
Model Curriculum Valid Up to Date	21-05-2025
Model Curriculum Version	1.0
Minimum Duration of the Course	400
Maximum Duration of the Course	400

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.

- Implement appropriate standards to assist in performing software construction as per specifications.
- Identify software development needs and changes.
- Design algorithms to solve problems and execute test cases to convert them into code.
- Evaluate the various software testing methodology and identify the correct one to deploy.
- Analyze software designs for already built products or services.
- Build data base skills including DBMS, data design for pre development process.
- Categorize between UML and Object Oriented Design.
- Discuss about manual and automated testing of software components.
- Demonstrate application of suitable Unit Test Cases to validate the process of testing.
- Demonstrate effective communication and collaboration with colleagues.
- Apply measures to maintain standards of health and safety at the workplace.
- Use different approaches to effectively manage and share data and information.
- Develop strong relationships at the workplace through effective communication and conflict management.
- Identify best practices to maintain an inclusive, environmentally sustainable workplace.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
<i>Module 1 (Bridge Module):</i> IT-ITeS/IT services industry – An Introduction	02:00	02:00	00:00	00:00	04:00
<i>Module 2 (Bridge Module):</i> IT Services – An Introduction	02:00	03:00	00:00	00:00	05:00
SSC/N0501 Contribute to the design of software products and applications NOS Version No. 2 NSQF Level 7	30:00	61:00	00:00	00:00	91:00
Module 3: Programming and Algorithms	10:00	30:00	00:00	00:00	40:00
Module 4: Analysis and Design of Software Applications	10:00	15:00	00:00	00:00	25:00



Module 5: Work requirement, tools and software	10:00	16:00	00:00	00:00	26:00
SSC/N0502 Develop software code to specification NOS Version No. 2 NSQF Level 7	35:00	100:00	00:00	00:00	135:00
Module 6: Process of Software Development	05:00	40:00	00:00	00:00	45:00
Module 7: Process of Application Development	15:00	30:00	00:00	00:00	45:00
Module 8: Concept of Software Testing	15:00	30:00	00:00	00:00	45:00
SSC/N9001 Manage your work to meet requirements NOS Version No. 2 NSQF Level 7	08:00	32:00	00:00	00:00	40:00
Module 9: Self and work Management	08:00	32:00	00:00	00:00	40:00
SSC/N9002 Work effectively with colleagues NOS Version No. 2 NSQF Level 7	08:00	32:00	00:00	00:00	40:00
Module 10: Team Work and Communication	08:00	32:00	00:00	00:00	40:00
SSC/N9003 Maintain a healthy, safe and secure working environment NOS Version No. 2 NSQF Level 7	05:00	25:00	00:00	00:00	30:00
Module 11: Managing Health and Safety	05:00	25:00	00:00	00:00	30:00
SSC/N9004 Provide Data/ Information in Standard Formats NOS Version No. 2 NSQF Level 7	05:00	25:00	00:00	00:00	30:00
Module 12: Workplace Data Management	05:00	25:00	00:00	00:00	30:00
SSC/N9014 Implement & Improve the Gender Sensitivity, PWD (Person/People with Disability) Sensitivity and Greening NOS Version No. 1 NSQF Level 7	05:00	20:00	00:00	00:00	25:00
Module 13: Inclusive and environmentally sustainable workplaces	05:00	20:00	00:00	00:00	25:00
Total Duration	100:00	300:00	00:00	00:00	400:00

Module Details

Module 1: IT-ITeS/IT Services Industry – An Introduction

Bridge Module

Training Outcomes:

- Comprehend various delivery models used in the IT-Support services industry.

Duration: 02:00	Duration: 02:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Identify the career path for a software developer. • List the various sub-sectors of the IT-ITeS industry. 	<ul style="list-style-type: none"> • Conduct internet browsing to collate information, evidence, and articles regarding the IT- ITeS/BPM industry. • Evaluate the key emerging trends in the IT- ITeS industry basis information gathered.
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)	



Module 2: IT Services – An Introduction

Bridge Module

Training Outcomes:

- Collate existing documents, language standards, templates and documentation tools for verification of queries related to software development.

Duration: 02:00	Duration: 03:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of the IT Software services sector. • List deployment issues of high capital investments, continuous business availability, turnaround time, communication costs, etc. in establishment of IT enabled services. 	<ul style="list-style-type: none"> • Categorize the services and sub-sectors under the Application development industry along with their scope. • Organize research via Internet browsing on global delivery models, which provides services to customers in an on-shore or off-shore basis.
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 3: Programming and Algorithms

Mapped to SSC/N0501

Training Outcomes:

- Implement appropriate standards to assist in performing software construction as per specifications.
- Identify software development needs and changes.
- Design algorithms to solve problems and execute test cases to convert them into code.

Duration: 10:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the steps involved in solving computational problems. • List the disadvantages of data flow diagrams. • Identify the process of algorithm development for software programming. 	<ul style="list-style-type: none"> • Evaluate various steps to construct the framework using an algorithm for a software application. • Execute simple programs, showing how input data is processed, output data is produced, and how the values of internal variables change. • Use proper application of scripting language to automate tasks and write simple programs. • Analyze the error messages of the compiler to identify and correct mistakes in program syntax while developing programs.
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 4: Analysis and Design of Software Applications

Mapped to SSC/N0501

Training Outcomes:

- Evaluate the various software testing methodology and identify the correct one to deploy.
- Analyze software designs for already built products or services.

Duration: 10:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Analyse 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 5: Work Requirement, Tools and Software

Mapped to SSC/N0501

Training Outcomes:

- Build data base skills including DBMS, data design for pre development process.
- Demonstrate application of source coding standards, ticketing tools and other IT related technologies.

Duration: 10:00	Duration: 16:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss methods to read a detailed program specification and implement it using a programming language. • Discuss the various software engineering approaches to develop applications and the key processes. 	<ul style="list-style-type: none"> • Create software requirement list for the following developmental process, including Testing, Maintenance, Enhancement, Development, etc. • Plan a logical analysis and pseudo code for software development • Build data base skills including DBMS, data design, and querying table structures for specific data. • Construct a documented resolution of statistical analysis accurately using documentation tools.
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 6: Process of Software Development

Mapped to SSC/N0502

Training Outcomes:

- Discuss best practices for documenting business processes and major functionalities of an application.
- Design testing strategies to identify and correct semantic errors in programs.

Duration: 05:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the phases of software development lifecycle. • Discuss the differences between top down and bottom up design approaches. 	<ul style="list-style-type: none"> • Analyse users' needs to design, test, and develop software as per requirement • Categorize each piece of an application or system and plan how the pieces will work together. • Design testing strategies like unit, integration, regression, system, alpha, beta testing, etc. to identify and correct semantic errors in programs. • Test a variety of models and diagrams that show customers, the software code needed for an application. • Construct a roadmap for every aspect of an application or system as a reference for future maintenance and upgrades.
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 7: Process of Application Development

Mapped to SSC/N0502

Training Outcomes:

- Categorize between UML and Object Oriented Design.
- Evaluate the various software testing methodology used in application development.
- Examine various UML diagrams to determine process suitability.

Duration: 15:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List software quality attributes and characteristics of a good SRS. • Discuss the primary differences between custom application development and rapid application development. 	<ul style="list-style-type: none"> • Categorize the process of top down approach and bottom up approach for developing an application. • Test Data Flow Diagrams (DFD), Structure Charts, HIPO, etc., for structured analysis. • Develop a decision table based on number of conditions that may affect the development process. • Categorize between UML and Object Oriented Design. • Examine various UML diagrams i.e. Class, Object, Use Case Sequence, Collaboration, etc., to identify the suitability. • Construct a class diagram of an Order System of an application prior to development.
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 8: Concept of Software Testing

Mapped to SSC/N0502

Training Outcomes:

- Discuss about manual and automated testing of software components.
- Demonstrate application of suitable Unit Test Cases to validate the process of testing.

Duration: 10:00	Duration: 18:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss validation and verification components covered under software testing. • Discuss about manual and automated testing of software components. • List the components of a test plan. • Discuss the suitability of solutions/workarounds, where available. 	<ul style="list-style-type: none"> • Utilize reusable components, code generation tools and unit testing tools to identify anomalies. • Design the conversion process of technical specifications into code to meet the requirements. • Create appropriate Unit Test Cases (UTCs). • Test and re-develop the code and UTCs to fix identified defects. • Execute UTCs and document the results for best practice.
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 9: Manage your Work to meet Requirements

Mapped to SSC/N9001

Mapped to SSC/N9001

Terminal Outcomes:

- Define the scope of work.
- Demonstrate effective work planning principles.
- Recognize the importance of using time and resources effectively.

Duration: 08:00	Duration: 32:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the role, responsibilities, and limits of the responsibilities. • Discuss the importance of gathering detailed work requirements and prioritizing work areas. • Identify commonly made mistakes in the prioritized work areas. • Explain the importance of completing work accurately. 	<ul style="list-style-type: none"> • Analyse needs, requirements and dependencies in order to meet the work requirements. • Apply resource management principles and techniques. • Demonstrate the ways to maintain an organized work area. • Apply effective time management principles.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools 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 10: Work Effectively with Colleagues

Mapped to SSC/N9002

Terminal Outcomes:

- Explain the methods and mechanisms for effective communication.
- Explain the importance of effective collaboration at workplace.

Duration: 08:00	Duration: 32:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the principles of clear communication. • Outline the importance of being a good listener and adhering to the commitments. • Identify challenges and pain points related to work distribution while working in a team. • Explain the importance of distributing and sharing workloads. 	<ul style="list-style-type: none"> • Use oral, written and non-verbal communication skills in a variety of forms to construct thoughts and ideas effectively. • Demonstrate professional behaviour at workplace. • Demonstrate effective team mentorship.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools 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 11: Managing Health and Safety

Mapped to SSC/N9003

Terminal Outcomes:

- Describe how to maintain a health, safe and secure environment at workplace.

Duration: 05:00	Duration: 25:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the importance of complying with organizational health, safety and security policies and procedures. Discuss possible roles and responsibilities that an employee can take up with respect to workplace safety management. Evaluate sample organizational emergency procedures. Identify mechanisms to improve workplace health, safety, and security. Label appropriate personal protective equipment needed for a job role. 	<ul style="list-style-type: none"> Demonstrate the identification of possible breaches in health, safety, and security policies. Document health, safety and security breaches. Design a contingency plan for emergency situations like fire, short circuit, accidents, earthquake, etc. Demonstrate the use of First Aid, CPR and safety evacuation process as part of routine operations.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools 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 A sample health and safety policy document, Emergency broadcast system and mock emergency signage in the appropriate areas of the training institute	

Module 12: Workplace Data Management

Mapped to SSC/N9004

Terminal Outcomes:

- Describe how data / information can be managed effectively.

Duration: 05:00	Duration: 25:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss data privacy in terms of sharing and retrieving data from different sources. Discuss the significance of providing accurate and up-to-date information on time. Identify the database management tools and importance of CRM database. 	<ul style="list-style-type: none"> Apply the concepts behind information and knowledge management. Perform rule-based analysis of data/information. Format the data/information into required types/forms. Demonstrate effective data management. Use CRM databases to record and extract information.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools 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 13: Inclusive and environmentally sustainable workplaces

Mapped to SSC/N9014

Terminal Outcomes:

- Illustrate sustainable practices at workplace for energy efficiency and waste management.
- Apply different approaches to maintain gender equality and increase inclusiveness for PwD.

Duration: 05:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe different approaches for efficient energy resource utilisation and waste management. • Describe the importance of following the diversity policies. • Identify stereotypes and prejudices associated with people with disabilities and the negative consequences of prejudice and stereotypes. • Discuss the importance of promoting, sharing and implementing gender equality and PwD sensitivity guidelines at organization level. 	<ul style="list-style-type: none"> • Practice the segregation of recyclable, non-recyclable and hazardous waste generated. • Demonstrate different methods of energy resource use optimization and conservation. • Demonstrate essential communication methods in line with gender inclusiveness and PwD sensitivity.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools 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	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Minimum Bachelor's Degree in Engineering/ Technology/ Science/ Computer Science or any graduate course.	Preferred Master's Degree in Engineering/ Technology/ Computer Science	Minimum 2 years' experience in software development domain.		1 year preferred	Minimum 2 years' experience in the Application development industry.	Certification in relevant software competencies: Software Development Certifications in C++, Embedded, C#, C, Java, etc., is an added advantage.

Trainer Certification	
Domain Certification	Platform Certification
Minimum accepted score in SSC Assessment is 80% per NOS being taught in "SSC/Q0501, V 2.0"	Recommended that the trainer is certified for the Job role "Trainer" mapped to the Qualification Pack "MEP/Q2601". Minimum accepted score is 80% aggregate



Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate in any discipline		2	Experience that involves client interaction	1-2	Experience that involves client interaction	

Assessor Certification	
Domain Certification	Platform Certification
Not Applicable	

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
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Productivity levels must be checked to ensure that it reflects those that are found in the work situation being replicated. 	<ul style="list-style-type: none"> 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 QP, a trainee should score an average of 70% across generic NOS' and a minimum of 70% for each technical NOS. 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

Model Curriculum

JUNIOR SOFTWARE DEVELOPER

SECTOR: IT-ITeS
SUB-SECTOR: IT Services
OCCUPATION: Application Development
REFERENCE ID: SSC/Qo5o8, version 1.0
NSQF LEVEL: 4



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the
IT-ITes Sector Skills Council NASSCOM

for
MODEL CURRICULUM

Complying to the National occupation standards of
Job Role / Qualification Pack Junior Software Developer
QP No. SSC/Qo5o8 NSQF level 4

Date of issuance: December 1st 2016

Valid Upto *: December 1st 2017

* Valid up to the next review date of the Qualitification Pack



Authorised Signatory
(IT-ITes Sector Skills Council NASSCOM)

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Junior Software Developer

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of "Junior Software Developer" in the "IT-ITes" Sector/Industry and aims at building the following key competencies in the learner.

Program Name	Junior Software Developer		
Qualification Pack Name & Reference ID.	Junior Software Developer SSC/Q0508, version 1.0		
Version No.	1.0	Version Update Date	31/12/2015
Pre-requisites to Training	10 th Standard		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> assist in performing software construction and software testing entry-level tasks in the IT Services industry manage work to meet requirements maintain a healthy, safe and secure working environment 		

The Course encompasses all six National Occupational Standards (NOS) of "Junior Software Developer" SSC/Q0508 Qualification Pack issued by "IT-ITes Sector Skills Council NASSCOM".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Assist in performing software construction and software testing entry-level tasks in the IT Services industry Theory Duration (hh:mm) 26:00 Practical Duration (hh:mm) 99:00 Corresponding NOS Code SSC/No506	Candidates will be able to: <ul style="list-style-type: none"> Demonstrate basic computer and internet literacy including operating a Computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, Managing mails and using social internet media. Demonstrate aptitude for analyzing information and making logical conclusions. Demonstrate knowledge of the foundational mathematical concepts in computing. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs. Read and execute a test case and record the outcome in the appropriate 	Refer to Unique Equipment Required section
2	Self and work Management Theory Duration (hh:mm) 30:00 Practical Duration	Candidates will be able to: <ul style="list-style-type: none"> Establish and agree work requirements with appropriate people Keep immediate work area clean and tidy Utilize time effectively Use resources correctly and efficiently Treat confidential information correctly 	Refer to Unique Equipment Required section

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>(hh:mm) 70:00</p> <p>Corresponding NOS Code SSC/N9001</p>	<ul style="list-style-type: none"> • Work in line with organization's policies and procedures • Work within the limits of job role • Obtain guidance from appropriate people, where necessary • Ensure work meets the agreed requirements 	
3	<p>Team Work and Communication</p> <p>Theory Duration (hh:mm) 12:00</p> <p>Practical Duration (hh:mm) 38:00</p> <p>Corresponding NOS Code SSC/N9002</p>	<p>Candidates will be able to:</p> <ul style="list-style-type: none"> • Obtain guidance from appropriate people to agree the analysis to be performed on the data • Obtain advice and guidance from appropriate people on issues with data analysis outside their area of competence or • Review the results of their analysis with appropriate people • Undertake modifications to your analysis based on inputs from appropriate people • Communicate with colleagues clearly, concisely and accurately • Work with colleagues to integrate their work effectively with them • Pass on essential information to colleagues in line with organizational requirements • Work in ways that show respect for colleagues • Carry out commitments they have made to colleagues • Let colleagues know in good time if they cannot carry out your commitments, explaining the reasons • Identify any problems they have working with colleagues and take the initiative to solve these problems • Follow the organization's policies and procedures for working with colleagues 	Refer to Unique Equipment Required Section
6	<p>Managing Health and Safety</p> <p>Theory Duration (hh:mm) 12:00</p> <p>Practical Duration (hh:mm) 38:00</p> <p>Corresponding NOS Code SSC/N9003</p>	<p>Candidates will be able to:</p> <ul style="list-style-type: none"> • Comply with organization's current health, safety and security policies and procedures • Report any identified breaches in health, safety, and security policies and procedures to the designated person • Identify and correct any hazards that can deal with safely, competently and within the limits of authority • Report any hazards that one is not competent to deal with to the relevant person in line with organizational procedures and warn other people who may be affected • Follow their organization's emergency procedures promptly, calmly, and efficiently • Identify and recommend opportunities for improving health, safety, and security to the designated person 	Refer to Unique Equipment Required section

Sr. No.	Module	Key Learning Outcomes	Equipment Required
7	Data and Information Management Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 35:00 Corresponding NOS Code SSC/g004	Candidates will be able to: <ul style="list-style-type: none"> • Complete any health and safety records legibly and accurately • Establish and agree with appropriate people the data/information they need to provide, the formats in which you need to provide it, and when they need to provide it • Obtain the data/information from reliable sources • Check that the data/information is accurate, complete and up-to-date • Obtain advice or guidance from appropriate people where there are problems with the data/information • Carry out rule-based analysis of the data/information, if required • Insert the data/information into the agreed formats • Check the accuracy of work, involving colleagues where required • Report any unresolved anomalies in the data/information to appropriate people • Provide complete, accurate and up-to-date data/information to the appropriate people in the required formats on time 	Refer to Unique Equipment Required Section
8	Learning and Self Development Theory Duration (hh:mm) 5:00 Practical Duration (hh:mm) 20:00 Corresponding NOS Code SSC/N9005	Candidates will be able to: <ul style="list-style-type: none"> • Obtain advice and guidance from appropriate people to develop your knowledge, skills and competence • Identify accurately the knowledge and skills they need for your job role • Identify accurately their current level of knowledge, skills and competence and any learning and development needs • Agree with appropriate people a plan of learning and development activities to address their learning needs • Undertake learning and development activities in line with their plan • Apply new knowledge and skills in the workplace, under supervision • Obtain feedback from appropriate people on their knowledge and skills and how effectively you apply them • Review their knowledge, skills and competence regularly and take appropriate action 	Refer to Unique Equipment Required Section

<p>Total Duration:</p> <p>Theory Duration (hh:mm) 100:00</p> <p>Practical Duration (hh:mm) 300:00</p>	<p>Unique Equipment Required: Training room should be fully furnished with the following equipment / tools / accessories. Additional / specific resources, wherever applicable (e.g. Hardware, software) are indicated in the main text corresponding to relevant learning outcome. For Domain NOS, For NOS SSC/No506 – HTML, C++ / Java, IDE</p> <p>General:</p> <ul style="list-style-type: none"> • Comfortable seats with adequate lighting, controlled temperature and acoustics for training and learning • White Board, Markers and Eraser • Projector with screen • Flip chart with markers • Faculty's PC/Laptop with latest configuration and internet connection • Supporting software / applications for projecting audio, video, recording, • Presentation Tools to support learning activities: • Intranet • Email • IMs • Learning management system e.g. Moodle, Blackboard to enable blended learning • Microphone / voice system for lecture and class activities • Handy Camera • Stationery kit – Staples, Glue, Chart Paper, Sketch Pens, Paint Box, Scale, A4 Sheets • For IT Lab sessions: 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. • Assessment and Test Tools for day to day online Tests and Assessments • For team discussions: Adequate seating arrangement in full / half circle format for one or more teams as per planned team composition. • Reading Resources: Access to relevant sample documents and learning forums to enable self-study before and after each training session.
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Grand Total Course Duration: 400 Hours 0 Minutes

Notes from IT-ITes Sector Skills Council NASSCOM

1. This document outlines the broad scope of coverage. This should be linked with OBF and training delivery plan. OBF (Outcome based framework) reflects the pedagogy used to ensure an expected outcome. Training delivery plan focuses on the sequence of delivery.
2. Though many NOSs have some seemingly common outcomes, notably core/generic, professional and technical skills, it is imperative to understand the contextual difference between them. For example, writing skills required to document program structure and code (in SSC/No506) are different from the writing skills required to prepare a time plan (in SSC/Ng001). Training providers are advised to,
 - a. Embed such skills development in the learning pedagogy for each expected outcome
 - b. Prepare a detailed session plan for training delivery with focus on sequence and duration of training
 - c. Run a diagnostic test to assess prior learning of students and help trainers / students identify the need for gap training, optimal duration and suitable training methodology. Accordingly, more introductory level sessions may

be included in guided or self-paced mode of learning. E.g. adding some sessions on Functional English or Use of Internet and MS Office.

Trainer Prerequisites for Job role: "Junior Software Developer" mapped to Qualification Pack: "SSC/Qo5o8"

Sr. No.	Area	Details
1	Job Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack SSC/Qo5o8.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in this field.
3	Minimum Educational Qualifications	Minimum 12 th Standard; Preferred Master's degree in any discipline
4a	Domain Certification	2 years of work/training experience with respect to QP/Occupation 80% marks achieved in QP /NOS assessment (i.e. aggregate- 80% & per NOS - 70%) Additional certification in customer orientation, dealing with difficult customers, written communication etc. will be an added advantage.
4b	Platform Certification	80% marks achieved in Trainer QP (MEP/o1o2)/TVET/ pedagogy assessments (i.e. aggregate- 80% & per NOS - 70%)
5	Experience	Field experience: Minimum 2 years' experience in the same domain Training experience: 1 year preferred

Annexure: Assessment Criteria

Assessment Criteria for Junior Software Developer	
Job Role	Junior Software Developer
Qualification Pack	SSC/Qo5o8
Sector Skill Council	IT-ITeS

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack (QP) will be created by the Sector Skill Council (SSC). Each performance criteria (PC) will be assigned Theory and Skill/Practical marks proportional to its importance in NOS.
2	The assessment will be conducted online through assessment providers authorised by SSC.
3	Format of questions will include a variety of styles suitable to the PC being tested such as multiple choice questions, fill in the blanks, situational judgment test, simulation and programming test.
4	To pass a QP, a trainee should pass each individual NOS. Standard passing criteria for each NOS is 70%.
5	For latest details on the assessment criteria, please visit www.sscnasscom.com .

				Marks Allocated	
Assessment Outcomes	Assessment Criteria for Outcomes	Total Mark	Out of	Theory	Skills Practical
1.SSC/No5o6 (Assist in performing software construction and software testing entry-level tasks in the IT Services Industry)	PC 1. Demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.	100	10	0	10
	PC 2. Demonstrate aptitude for analysing information and making logical conclusions.		25	10	15
	PC 3. Demonstrate knowledge of the foundational mathematical concepts in computing.		20	5	15
	PC 4. Design algorithms to solve problems and convert them into code using the appropriate programming language constructs.		30	10	20
	PC 5. Read and execute a test case and record the outcome in the appropriate template.		10	5	5
	PC 6. Be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.		5	0	5
		Total	100	30	70
3.NOS/N9oo1 (Manage your work to meet requirements)	PC1. Establish and agree your work requirements with appropriate people	100	6.25	0	6.25
	PC2. Keep your immediate work area clean and tidy		12.5	6.25	6.25
	PC3. Utilize your time effectively		12.5	6.25	6.25
	PC4. Use resources correctly and efficiently		18.75	6.25	12.5
	PC5. Treat confidential information correctly		6.25	0	6.25
	PC6. Work in line with your organization's policies and procedures		12.5	0	12.5
	PC7. Work within the limits of your job role		6.25	0	6.25
	PC8. Obtain guidance from appropriate people, where necessary		6.25	0	6.25
	PC9. Ensure your work meets the agreed requirements		18.75	6.25	12.5

		Total	100	25	75
4.SSC/N9002 (Work effectively with colleagues)	PC1. Communicate with colleagues clearly, concisely and accurately	100	20	0	20
	PC2. Work with colleagues to integrate your work effectively with theirs		10	0	10
	PC3. Pass on essential information to colleagues in line with organizational requirements		10	10	0
	PC4. Work in ways that show respect for colleagues		20	0	20
	PC5. Carry out commitments you have made to colleagues		10	0	10
	PC6. Let colleagues know in good time if you cannot carry out your commitments, explaining the reasons		10	10	0
	PC7. Identify any problems you have working with colleagues and take the initiative to solve these problems		10	0	10
	PC8. Follow the organization's policies and procedures for working with colleagues		10	0	10
	Total	100	20	80	
5.SSC/N9003 (Maintain a healthy, safe and secure working environment)	PC1. Comply with your organization's current health, safety and security policies and procedures	100	20	10	10
	PC2. Report any identified breaches in health, safety, and security policies and procedures to the designated person		10	0	10
	PC3. Identify and correct any hazards that you can deal with safely, competently and within the limits of your authority		20	10	10
	PC4. Report any hazards that you are not competent to deal with to the relevant person in line with organizational procedures and warn other people who may be affected		10	0	10
	PC5. Follow your organization's emergency procedures promptly, calmly, and efficiently		20	10	10
	PC6. Identify and recommend opportunities for improving health, safety, and security to the designated person		10	0	10
	PC7. Complete any health and safety records legibly and accurately		10	0	10
	Total	100	30	70	
6.SSC/N9004 (Provide data/information in standard formats)	PC1. Establish and agree with appropriate people the data/information you need to provide, the formats in which you need to provide it, and when you need to provide it	100	12.5	12.5	0
	PC2. Obtain the data/information from reliable sources		12.5	0	12.5
	PC3. Check that the data/information is accurate, complete and up-to-date		12.5	6.25	6.25
	PC4. Obtain advice or guidance from appropriate people where there are problems with the data/information		6.25	0	6.25
	PC5. Carry out rule-based analysis of the data/information, if required		25	0	25
	PC6. Insert the data/information into the agreed formats		12.5	0	12.5

	PC7. Check the accuracy of your work, involving colleagues where required		6.25	0	6.25
	PC8. Report any unresolved anomalies in the data/information to appropriate people		6.25	6.25	0
	PC9. Provide complete, accurate and up-to-date data/information to the appropriate people in the required formats on time		6.25	0	6.25
		Total	100	25	75
7.SSC/Ng005 (Develop your knowledge, skills and competence)	PC1. Obtain advice and guidance from appropriate people to develop your knowledge, skills and competence	100	10	0	10
	PC2. Identify accurately the knowledge and skills you need for your job role		10	0	10
	PC3. Identify accurately your current level of knowledge, skills and competence and any learning and development needs		20	10	10
	PC4. Agree with appropriate people a plan of learning and development activities to address your learning needs		10	0	10
	PC5. Undertake learning and development activities in line with your plan		20	10	10
	PC6. Apply your new knowledge and skills in the workplace, under supervision		10	0	10
	PC7. Obtain feedback from appropriate people on your knowledge and skills and how effectively you apply them		10	0	10
	PC8. Review your knowledge, skills and competence regularly and take appropriate action		10	0	10
			Total	100	20