



IT - ITes SSC
NASSCOM



Model Curriculum

QP Name: JUNIOR SOFTWARE DEVELOPER

QP Code: SSC/Q0508

QP Version: 3.0

NSQF Level: 3

Model Curriculum Version: 3.0

IT-ITes Sector Skills Council NASSCOM | Plot No – 7, 8, 9 & 10, Sector 126, Noida, UP.
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Training Parameters

Sector	IT-ITeS
Sub-Sector	IT Services
Occupation	Application Development
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/ 2512.0205
Minimum Educational Qualification and Experience	10th Class OR NSQF Level 2 STT with 1 year Experience in computer operation Min Age-15 Years
Pre-Requisite License or Training	Software Development Certifications in C++, Embedded, C#, C, Java, etc.
Minimum Job Entry Age	15 Years
Last Reviewed On	17-11-2022
Next Review Date	17-11-2025
NSQC Approval Date	17-11-2022
QP Version	3.0
Model Curriculum Creation Date	17-11-2022
Model Curriculum Valid Up to Date	17-11-2025
Model Curriculum Version	3.0
Minimum Duration of the Course	450 hours
Maximum Duration of the Course	450 hours

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.

- Collate existing documents, language standards, templates for various operating systems related to technical support.
- Design and modify problem solving process flow for software development.
- Apply principles of access management, application installation and peripheral installation to identify technical aspects for software designs.
- Design algorithms to solve problems and execute test cases to convert them into code.
- Evaluate the detailed creation process of working meaningful software through a combination of coding, verification, unit testing, integration testing, and debugging.
- Design methods to execute test cases without using any automation tools or create automation frameworks for the team.
- Demonstrate application of rule-based analysis and the various language standards used.
- 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.

Compulsory Modules

The table lists the modules and their duration 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/N0506 Assist in performing software construction and software testing entry-level tasks in the IT Services industry NOS Version No. 2 NSQF Level 3	86:00	244:00	00:00	00:00	330:00



Module 1: Basics of IT	14:00	41:00	00:00	00:00	55:00
Module 2: Problem solving and program design	17:00	41:00	00:00	00:00	58:00
Module 3: Technical Specifications for software construction	14:00	41:00	00:00	00:00	55:00
Module 4: Basic Algorithms and Application Development	17:00	41:00	00:00	00:00	58:00
Module 5: Work requirement and roles at entry level	10:00	40:00	00:00	00:00	41:00
Module 6: Tools and software for testing entry level tasks	14:00	40:00	00:00	00:00	54:00
Employability Skill 60 Hours	24:00	36:00	00:00	00:00	60:00
Module 7: Introduction to Employability Skills	00:30	01:00	00:00	00:00	01:30
Module 8: Constitutional values - Citizenship	00:30	01:00	00:00	00:00	01:30
Module 9: Becoming a Professional in the 21st Century	01:00	01:30	00:00	00:00	02:30
Module 10: Basic English Skills	04:00	06:00	00:00	00:00	10:00
Module 11: Career Development & Goal Setting	01:00	01:00	00:00	00:00	02:00
Module 12: Communication Skills	02:00	03:00	00:00	00:00	05:00
Module 13: Diversity & Inclusion	01:00	01:30	00:00	00:00	02:30
Module 14: Financial and Legal Literacy	02:00	03:00	00:00	00:00	05:00
Module 15: Essential Digital Skills	04:00	06:00	00:00	00:00	10:00
Module 16: Entrepreneurship	03:00	04:00	00:00	00:00	07:00
Module 17: Customer Service	02:00	03:00	00:00	00:00	05:00
Module 18: Getting ready for apprenticeship & Jobs	03:00	05:00	00:00	00:00	08:00
OJT	00:00	00:00	60:00	00:00	60:00
Total Duration	110:00	280:00	60:00	00:00	450:00

Module Details

Module 1: Basics of IT

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Collate existing documents, language standards, templates for various operating systems related to technical support.
- Demonstrate application of various IT components and operating systems.

Duration: 14:00(In Hours)	Duration: 41:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss about the basic components of Windows and Linux OS, file systems, task, and process management for software development. • List the standards associated with entry level roles for software developers. 	<ul style="list-style-type: none"> • Comprehend the effectiveness of various technologies related to operating systems (e.g., Windows, UNIX, Macintosh), networks (e.g., LAN, WAN, VPN, IP, wireless, network devices) and PC lifecycle management tools (e.g., SMS, SCOM, Marimba, Altris). • Observe the use of IT components, including web browsers, internet mail, social media applications, web programming, 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 HTML, C++ / Java, IDE	

Module 2: Problem Solving and Program Design

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Examine foundational concepts of computation including binary mathematics, discrete mathematics, etc., to assist in problem computation.
- Design and modify problem solving process flow for software development.

Duration: 17:00(In Hours)	Duration: 41:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the tools and processes for incident management in problem computation. • Identify problem specification and algorithm development to solve software code related issues. 	<ul style="list-style-type: none"> • Demonstrate the 3-step problem solving approach strategy for error mitigation, including identification, specification, and reverse algorithm development. • Test the usefulness of foundational concepts of computation including binary arithmetic and number sense to solve design codes related problems. • Detail out data in the form of Crosstabs, Frequency Distributions and Charts
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 HTML, C++ / Java, IDE	

Module 3: Technical Specifications for Software Construction

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Apply principles of access management, application installation and peripheral installation to identify technical aspects for software designs.
- Describe the software's non-functional requirements such as performance, security, and UI design.

Duration: 14:00(In Hours)	Duration: 41:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the latest changes, procedures, and practices in the field of software development as best practice. • Discuss how to store and retrieve information related to software technicalities. 	<ul style="list-style-type: none"> • Analyse the scope, functional and non-functional requirements of developing software modules. • Demonstrate application of source coding standards, ticketing tools and utilities/tools for handling service requests. • Examine anomalies in software configuration data. • Create a draft SRS document with proper naming convention.
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 HTML, C++ / Java, IDE	

Module 4: Basic Algorithm and Application Development

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Design algorithms to solve problems and execute test cases to convert them into code.
- Identify the steps of effective co-ordination for carrying out assigned test cases and their outcome.

Duration: 17:00(In Hours)	Duration: 41:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the concept of software design and algorithm design. • Discuss the concept of incident management during algorithm design and the process flow to resolve a disruption. • Differentiate between agile and rapid application development process. 	<ul style="list-style-type: none"> • Use algorithms to convert into code using the appropriate programming language. • Choose a programming language to run program specifications. • Implement query tables to extract data from database. • Execute a test case and record the outcome in the assigned template.
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 HTML, C++ / Java, IDE.	

Module 5: Work Requirements and Roles at Entry Level

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Evaluate the detailed creation process of working meaningful software through a combination of coding, verification, unit testing, integration testing, and debugging.

Duration: 10:00(In Hours)	Duration: 40:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Deliberate the purpose of variables, constants, and classes in yielding better coding standards. Categorize basic types of work requirement related to software development, including Information (qualitative and quantitative), Algorithms (steps in problem solving), etc. 	<ul style="list-style-type: none"> Demonstrate mechanisms to process requirements related to testing, maintenance, enhancement, documentation of entry level technicalities. Construct logical analysis, problems solving skills, process approach and pseudo code for software development. Analyse the use of linguistic notations, visual notations, and formal notations in developing software code.
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 HTML, C++ / Java, IDE	

Module 6: Tools and Software for testing Entry Level Tasks

Mapped to SSC/N0506, v2.0

Training Outcomes:

- Demonstrate application of rule-based analysis and the various language standards used.

Duration: 14:00(In Hours)	Duration: 40:00(In Hours)
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the various software engineering approaches to develop applications. • Discuss the purpose of C++, Java, Smalltalk, and Visual Basic in yielding better language standards. • Discuss how to store and retrieve information. 	<ul style="list-style-type: none"> • Build data base skills including DBMS, data design, and querying table structures for specific data. • Design methods to either execute test cases without using any automation tools or create automation frameworks for the team. • Construct a documented resolution of statistical analysis. • Execute the policies and compliance requirements that apply to IT service requests for software coding.
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 HTML, C++ / Java, IDE	

Module 7: Introduction to Employability Skills

Mapped to NOS 60 Hours (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 8: Constitutional values - Citizenship

Mapped to NOS 60 Hours (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 9: Becoming a Professional in the 21st Century

Mapped to NOS 60 Hours (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 10: Basic English Skills

Mapped to NOS 60 Hours (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 11: Career Development and Goal Setting

Mapped to NOS 60 Hours (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 12: Communication skills

Mapped to NOS 60 Hours (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 13: Diversity and Inclusion

Mapped to NOS 60 Hours (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 14: Financial and Digital Literacy

Mapped to NOS 60 Hours (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 15: Essential Digital Skills

Mapped to NOS 60 Hours (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 16: Entrepreneurship

Mapped to NOS 60 Hours (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 17: Customer Service

Mapped to NOS 60 Hours (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 18: Getting Ready for Apprenticeship and Jobs

Mapped to NOS 60 Hours (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)

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Minimum 12th Standard.	Preferred Master's degree in any discipline. OR CITS + 1 year domain experience.	Minimum 2 years' experience in the software development domain.		1 year preferred	Minimum 2 years' experience in software development	Additional certification in customer orientation, dealing with difficult customers, written communication etc. will be an added advantage.

Trainer Certification	
Domain Certification	Platform Certification
Minimum accepted score in SSC Assessment is 80% per NOS being taught in "SSC/Q0508, 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 QF, a trainee should score a minimum aggregate of 50% 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