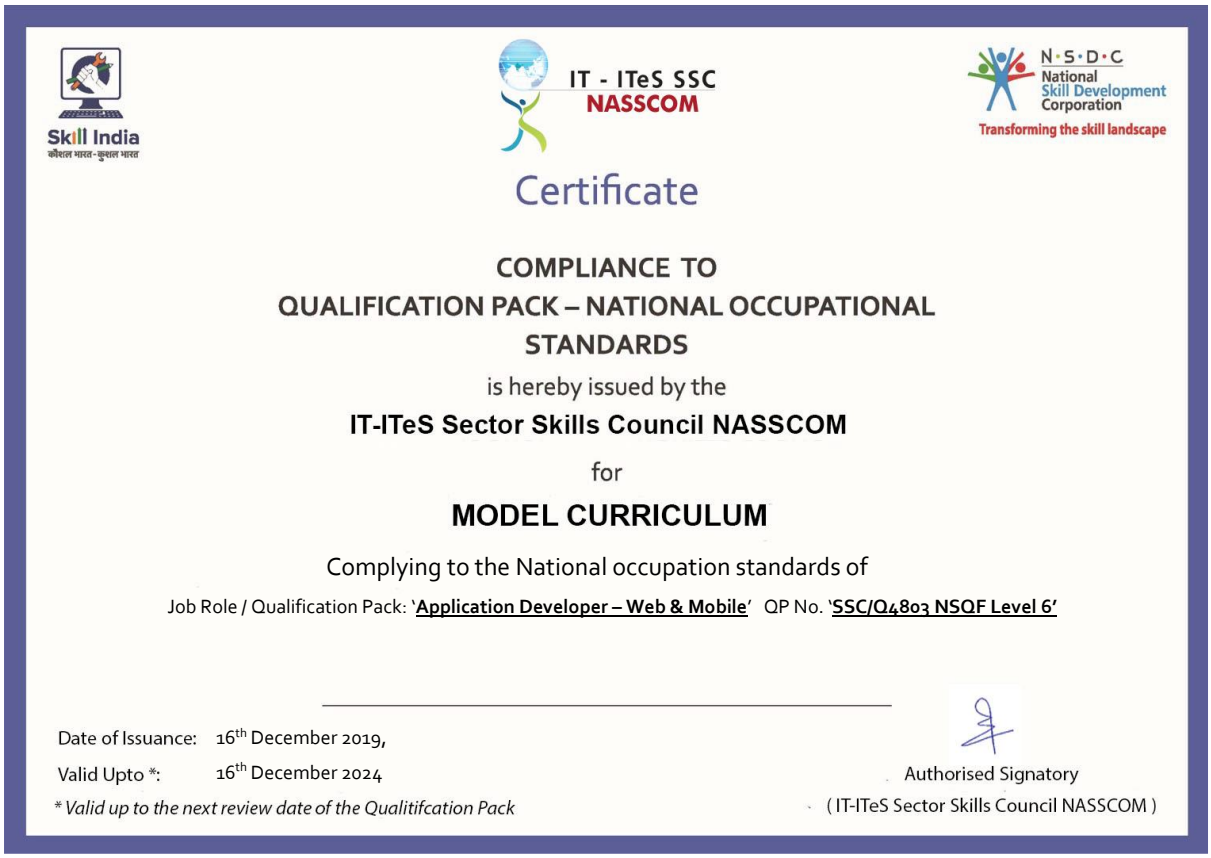
Model Curriculum

Application Developer – Web & Mobile

SECTOR: IT-ITeS
SUB-SECTOR: FUTURE SKILLS
OCCUPATION: Web and Mobile Development
REF ID: SSC/Q8403, V1.0
NSQF LEVEL: 6



Skill India

IT - ITeS SSC NASSCOM

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

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: '**Application Developer – Web & Mobile**' QP No. '**SSC/Q4803 NSQF Level 6**'

Date of Issuance: 16th December 2019,

Valid Upto *: 16th December 2024

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

Authorised Signatory

(IT-ITeS Sector Skills Council NASSCOM)

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Application Developer – Web & Mobile

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Application Developer – Web & Mobile", in the "IT- ITeS" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Application Developer – Web & Mobile**		
Qualification Pack Name and Reference ID.	SSC/Q8403, V1.0		
Version No.	1.0	**Version Update Date**	16/12/2019
Pre-requisites to Training	Bachelor's Degree in Engineering / Technology / Statistics / Mathematics / Computer Science/ Physical Sciences		
Training Outcomes	**After completing this programme, participants will be able to:** • Explain the nature of work across the IT-ITeS sector, the various sub sectors under it and different types of occupations under the Future Skills sub sector • Explain different types of web technologies, their evolution, their use cases and business applications • Leverage different types of mobile technologies, explain their use cases and demonstrate application of different types of tools, frameworks, platforms, libraries and software packages to test hardware and software systems • Assess global standards and regulations for aspects of data administration and governance such as storage, security, privacy and monitoring • Use development tools, frameworks, platforms, libraries and packages to test hardware and software systems • Implement the principles for continuous delivery, continuous integration and continuous deployment in the software development process • Test applications for software bugs by developing appropriate test case and automating the testing process using suitable tools and APIs • Identify, report and fix software bugs using best practices • Monitor the performance of web and mobile based application by defining and tracking Key Performance Indicators (KPIs)		

	• Guide team to improve performance and achieve the desired goals through efficient resource planning, continuous monitoring and clear correspondence • Build new alliances at workplace by partnering with stakeholders and maintain existing relations by ensuring stakeholder satisfaction **ELECTIVES:** • Front-end Development: Construct secure front-end web applications that meet the functional, non-functional and user experience requirements of the application • Mobile Application Development: Build secure, resilient and fault-tolerant applications for mobile based platforms • Back-end Development: Develop secure and scalable back-end technology stack for different web and mobile based applications

This course encompasses 8 out of 8 National Occupational Standards (NOS), of 3 out of 3 electives of "Application Developer – Web & Mobile" Qualification Pack issued by "IT-ITeS Sector Skills Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required

1	**IT-ITeS/BPM Industry – An Introduction**
	
	Theory Duration (hh:mm)
	06:00
	Practical Duration (hh:mm)
	03:00
	
	Corresponding NOS Code
	Bridge Module
		• Explain the relevance of the IT-ITeS sector
		• State the various sub-sectors in the IT-ITeS sector
		• Detail the nature of work performed across the sub-sectors
		• List organizations in the sector
		• Discuss the evolution of the sub sectors and the way forward
		• Explain the disruptions happening across the IT-ITeS sector
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Lab equipped with the following:
			  ◦ PCs/Laptops
			  ◦ Chart paper and sketch pens
			  ◦ Internet with Wi-Fi (Min 2 Mbps Dedicated)

2	**Future Skills – An Introduction**
	
	Theory Duration (hh:mm)
	01:00
	Practical Duration (hh:mm)
	01:00
	
	Corresponding NOS Code
	Bridge Module
		• Provide an overview of the Future Skills sub-sector
		• Explain the various occupations under this sub-sector
		• List key trends across the occupations in this sub-sector
		• List various roles in the Future Skills sub-sector
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Lab equipped with the following:
			  ◦ PCs/Laptops
			  ◦ Chart paper and sketch pens
			  ◦ Internet with Wi-Fi (Min 2 Mbps Dedicated)

3	**Web technology – An Introduction**
	
	Theory Duration (hh:mm)
	01:00
	Practical Duration (hh:mm)
	01:00
	
	Corresponding NOS Code
	Bridge Module
		• Define the terms "Internet" and "Web technology"
		• Provide an overview of different components of the internet
		• Discuss the evolving information technology landscape and the importance and relevance of Web technologies
		• State the key business drivers for adoption of web technologies
		• Discuss the different types of web technologies
		• Analyze different use cases and applications of web technologies and their applications across industries
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

4	**Mobile Development – An Introduction** **Theory Duration (hh:mm)** **01:00** **Practical Duration (hh:mm)** **01:00** **Corresponding NOS Code** **Bridge Module**	• Define "Mobile technology" and its different components • Discuss the commonly used Mobile development platforms (such as iOS, Android etc.) • Discuss the evolving information technology landscape and the importance and relevance of Mobile technologies • State the key business drivers for adoption of Mobile technologies • Analyze different use cases and applications of Mobile technologies and their applications across industries	• Whiteboard and Markers • LCD Projector and Laptop for presentations • Provision for word processor and presentation software • Lab equipped with the following: • PCs/Laptops • Internet with Wi-Fi (Min 2 Mbps Dedicated)

5	**Global Standards and Regulations**
	
	Theory Duration (hh:mm)
	06:00
	Practical Duration (hh:mm)
	03:00
	
	Corresponding NOS Code
	Bridge Module
		• Identify general principles and basic concepts of data management standards across the globe
		• Identify the key actors under the regulations and understand their roles
		• Evaluate the rights of data owners
		• Evaluate various enforcement and compliance mechanisms
		• Demonstrate actions in accordance with enforcement and compliance obligations
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

6	**Development Tools and Usage**
	
	Theory Duration (hh:mm)
	02:00
	Practical Duration (hh:mm)
	02:00
	
	Corresponding NOS Code
	Bridge Module
		• Examine good programming styles and documentation habits
		• Use scripting languages to automate tasks and write simple programs
		• Use appropriate tools for building, debugging, testing, tuning, and maintaining programs
		• Configure operating system components
		• Identify software development needs and changes
		• Use various cloud computing platforms and services
		• Apply principles of code and design quality
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

7	**Continuous Integration, Delivery and Deployment**
	
	Theory Duration (hh:mm)
	10:00
	Practical Duration (hh:mm)
	25:00
		• Discuss the principles of continuous integration, continuous delivery and continuous deployment
		• Explain what version control is
		• Demonstrate how to manage changes to source
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Chart paper and sketch pens

	Corresponding NOS Code **SSC/N8417**	code using standard version control tools • Discuss how to secure the source code repository • Examine and evaluate standard practices for code tagging, branching, merger and integration • Demonstrate how to integrate version control systems with the deployed project management tools • Explain different types of application environment variables and how to manage the configurations of target environments • Demonstrate how to automate application testing using standard tools and scripts • Demonstrate how to write test cases to indent failure • Explain how to continuously integrate bugs fixes in the application builds • Discuss best practices for application deployment • Demonstrate how to push applications to their appropriate services (such as web servers, API services, database services etc.) • Demonstrate how to automate the CI/CD (continuous integration/continuous delivery) pipeline using standard automation tools (such as Chef, Bamboo etc.)	• Internet with Wi-Fi (Min 2 Mbps Dedicated)

8	**Test Engineering**
	
	Theory Duration (hh:mm)
	25:00
	
	Practical Duration (hh:mm)
	50:00
	
	Corresponding NOS Code
	SSC/N8125
		• Assess how different business and technical requirements translate into products
		• Assess different types of testing and testing requirements such as unit, sub-system, system, etc.
		• Evaluate reusability of test scenarios, test cases, scripts and tools
		• Apply the different types of testing methodologies
		• Develop test cases for software components of the system
		• Develop test cases for hardware components of the system
		• Use tools such as Selenium to design automated test scripts
		• Develop simulations for testing software and hardware systems
		• Assess the type of test data that should be created
		• Recommend modifications to the design of software and hardware system based on the test data
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Chart paper and sketch pens
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

9	**Bugs fixing and performance improvement**
	
	Theory Duration (hh:mm)
	12:00
	Practical Duration (hh:mm)
	22:00
	
	Corresponding NOS Code
	SSC/N8418
		• Explain how to identify and record software bugs
		• Explain different types of bugs (such as unexpected, null, bad input etc.)
		• Demonstrate best practices for logging bugs in a case tracking system
		• Demonstrate how to identify user behavior prior to bug identification
		• Demonstrate how to analyze and isolate portion of source code where the bug occurs
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Chart paper and sketch pens
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

		• Demonstrate how build unit test cases to identify and isolate software bugs • Discuss how to continuously iterate and develop software code free of any bugs • Log all activities of the application • Analyze abnormal system behavior using application log	

10	**Application Performance Monitoring**
	
	Theory Duration (hh:mm)
	14:00
	Practical Duration (hh:mm)
	34:00
	
	Corresponding NOS Code
	SSC/N8323
		• Explain how application performance is related to business outcomes
		• Discuss the different types of cloud deployment models
		• Explain cloud resource utilization patterns
		• Explain how cloud resources are billed depending on different cloud deployment models
		• Discuss the different parameters for monitoring performance of cloud systems
		• Explain how to examine application log data to find clues to problems related to application performance
		• Discuss how to create a process to monitor application performance
		• Explain how to automate the performance monitoring process using scripts and Application Performance Monitoring (APM) tools
		• Explain how to generate performance reports from application monitoring tools
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  ◦ PCs/Laptops
			  ◦ Chart paper and sketch pens
			  ◦ Internet with Wi-Fi (Min 2 Mbps Dedicated)
			•

11	**Develop Knowledge, Skills and Competence** **Theory Duration (hh:mm)** **06:00** **Practical Duration (hh:mm)** **19:00** **Corresponding NOS Code** **SSC/N9005**	• Recognize the importance of self-development • Identify knowledge and skills required for the job • Identify avenues for self-development • Create plans for self-development • Develop a customer centric attitude • Collaborate with team to work effectively	• Whiteboard and Markers • LCD Projector and Laptop for presentations • Provision to write emails and send in the lab • Lab with provision for internet, email, word processor and presentation software • Chart paper, markers, picture magazines and old newspapers
12	**Build and Maintain Relationships At The Workplace** **Theory Duration (hh:mm)** **10:00** **Practical Duration (hh:mm)** **15:00** **Corresponding NOS Code** **SSC/N9006**	• Recognize the importance of open and effective communication • Discuss methods that build rapport such as remembering names, being empathetic, mirroring, etc. • Meet colleagues/clients and build new professional relationships with them • Discuss the importance of active listening • Apply different approaches for conflict management • Apply different approaches to recognize and motivate others • Show appreciation to colleagues and swiftly address their concerns • Discuss methods for becoming a supportive team player • Discuss methods to maintain relationships with colleagues/clients	• Whiteboard and Markers • LCD Projector and Laptop for presentations • Provision to write emails and send in the lab • Lab with provision for internet, email, word processor and presentation software • Chart paper, markers, picture magazines and old newspapers

13	**Persuasive Communication** **Theory Duration (hh:mm)** **10:00** **Practical Duration (hh:mm)** **15:00** **Corresponding NOS Code** **SSC/N9010**	• Discuss the principles of persuasive communication, credibility and trust • Discuss the differences between persuasion and manipulation • Enhance visual and verbal communication to be more persuasive • Demonstrate how to use evidences to support arguments	• Whiteboard and Markers • LCD Projector and Laptop for presentations • Provision to write emails and send in the lab • Lab with provision for internet, email, word processor and presentation software • Chart paper, markers, picture magazines and old newspapers
14	**Stakeholder Management** **Theory Duration (hh:mm)** **10:00** **Practical Duration (hh:mm)** **15:00** **Corresponding NOS Code** **SSC/N9012**	• Define the needs and perspectives of the stakeholders in order to build consensus • Employ active listening behaviors while communicating with stakeholders • Build rapport and collaborate with the stakeholders • Manage the expectations of the stakeholders, including quality and performance expectations • Provide continuous updates on project/activity status and changes in timelines • Evaluate the fundamentals of negotiations such as negotiating positions, BATNA (Best Alternative to a Negotiated Agreement) and integrative and distributive negotiations • Identify causes of conflict and methods to resolve conflict	• Whiteboard and Markers • LCD Projector and Laptop for presentations • Provision to write emails and send in the lab • Lab with provision for internet, email, word processor and presentation software • Chart paper, markers, picture magazines and old newspapers

	Compulsory Total Duration:
	
	Theory Duration 114:00
		Unique Equipment Required
		• Whiteboard and Markers
		• LCD Projector and Laptop for presentations
		• Lab equipped with the following: -
		  ◦ PCs/Laptops
		  ◦ Internet with Wi-Fi (Min 2 Mbps Dedicated)	

	Practical Duration 206:00	• Provision to write emails and send in the lab • Chart paper, markers, picture magazines and old newspapers **Popular Software Tools** Integrated Development Environments: Eclipse, Netbeans, Visual Studio, Atom etc. Application monitoring tools: Amazon Cloudwatch, Microsoft cloud monitoring, AppDynamics, Retrace etc. CI/CD tools: Jenkins, TravisCI, GitLab etc. Configuration management tools: Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo Workflow management tools: Evernote, Jira, VersionOne, Workzone, Scrum Mate etc.

ELECTIVES (Mandatory to select at least one)

ELECTIVE 1: Front-end Web Development

Sr. No.	Module	Key Learning Outcomes	Equipment Required

1	**Front-end Web Development**
	
	Theory Duration (hh:mm) 10:00
	Practical Duration (hh:mm) 30:00
	
	Corresponding NOS Code SSC/N8414
		• Comprehend the scope of any application
		• Discuss what are functional and non-functional requirements
		• Discuss what are user-experience requirements
		• Explain the front-end components of any web application – HTML, CSS and JavaScript
		• Exhibit essential components of a web page (such as header, menu, footer etc.)
		• Demonstrate how to build static web pages using HTML and CSS
		• Demonstrate how to construct interactive web pages using JavaScript
		• Demonstrate how to develop responsive web-sites that can adjust to any screen size
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Chart paper and sketch pens
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

		• Demonstrate how to create single page websites using standard web frameworks (such as Angular, Ember etc.) • Demonstrate how to build re-usable web UI components • Build prototypes using standards web builder tools • Discuss common security controls implemented to secure a web-site • Build test cases to check the web application for bugs before launch • Run unit tests on different modules of the web site • Demonstrate how to automate testing using standard tools (such as selenium, Appium etc.)	

	ELECTIVE 1: Total Duration
	
	Theory Duration 10:00
	
	Practical Duration 30:00
		Unique Equipment Required
		• Whiteboard and Markers
		• LCD Projector and Laptop for presentations
		• Lab equipped with the following: -
		  • PCs/Laptops
		  • Internet with Wi-Fi (Min 2 Mbps Dedicated)
		  • Provision to write emails and send in the lab
		  • Chart paper, markers, picture magazines and old newspapers
		
		Popular Software Tools
		(At least one of the tools listed below is required)
		
		Integrated Development Environments: Eclipse, Netbeans, Visual Studio, Atom etc.
		Application monitoring tools: Amazon Cloudwatch, Microsoft cloud monitoring, AppDynamics, Retrace etc.
		CI/CD tools: Jenkins, TravisCI, GitLab etc.
		Configuration management tools: Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo
		Workflow management tools: Evernote, Jira, VersionOne, Workzone, Scrum Mate etc.	

ELECTIVE 2: Mobile Application Development

Sr. No.	Module	Key Learning Outcomes	Equipment Required

1	**Mobile Application Development**
	
	Theory Duration (hh:mm)
	10:00
	Practical Duration (hh:mm)
	30:00
	
	Corresponding NOS Code
	SSC/N8415
		• Explain how to gather information about scope of the mobile solution, target users and other similar solutions available in the market
		• Discuss what are functional and non-functional requirements
		• Discuss what are user-experience requirements
		• Examine popular mobile platforms and their characteristics (such as Android, iOS, SailfishOS etc.)
		• Show different types of mobile applications and their characteristics (such as native application, cross-platform application, hybrid application etc.)
		• Demonstrate how to build a native mobile application
		• Demonstrate how to develop a cross-platform mobile application
		• Demonstrate how to build a hybrid mobile application
		• Demonstrate how to build a progressive web application (PWA)
		• Discuss the different types of dependencies associated with mobile application development (such as time to market, access to device hardware functionalist, support for 3rd party integrations etc.)
		• Describe security standards and configurations that make
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  • PCs/Laptops
			  • Chart paper and sketch pens
			  • Internet with Wi-Fi (Min 2 Mbps Dedicated)

		the mobile application secure • Demonstrate how to secure data on the mobile device using encryption and obfuscation • Demonstrate A/B testing • Explain how to build A/B testing capabilities to test products and features • Create and manage service configurations for mobile applications • Demonstrate how to manage source code using version control tools • Discuss popular app-stores (such as Play store, App Store etc.) • Demonstrate how to publish mobile applications on different app-stores • Demonstrate how to build test cases to test mobile application before launch • Demonstrate how to run unit tests on different units of the mobile application • Demonstrate how to automate testing using standard tools (such as selenium, Appium etc.)	

	ELECTIVE 2: Total Duration
	
	Theory Duration 10:00
	
	Practical Duration 30:00
		Unique Equipment Required
		• Whiteboard and Markers
		• LCD Projector and Laptop for presentations
		• Lab equipped with the following: -
		  • PCs/Laptops
		  • Internet with Wi-Fi (Min 2 Mbps Dedicated)
		  • Provision to write emails and send in the lab
		  • Chart paper, markers, picture magazines and old newspapers
		
		Popular Software Tools
		(At least one of the tools listed below is required)	

		Integrated Development Environments: Eclipse, Netbeans, Visual Studio, Atom etc. Application monitoring tools: Amazon Cloudwatch, Microsoft cloud monitoring, AppDynamics, Retrace etc. CI/CD tools: Jenkins, TravisCI, GitLab etc. Configuration management tools: Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo Workflow management tools: Evernote, Jira, VersionOne, Workzone, Scrum Mate etc.

ELECTIVE 3: Back-end Engineering

Sr. No.	Module	Key Learning Outcomes	Equipment Required

1	**Back-end Engineering**
	
	Theory Duration (hh:mm) 10:00
	Practical Duration (hh:mm) 30:00
	
	Corresponding NOS Code SSC/N8416
		• Explain what back-end engineering is and how to demarcate between font-end and back-end responsibilities
		• Discuss how to identify the scope of back-end operations and functionalities
		• Design and develop server end-points to connect back-end servers with the client
		• Develop stubs for upstream and backstream
		• List the different types of back-end application dependencies (such as Databases, Caching, Messaging Queues, Web services, HTTP APIs etc.)
		• Demonstrate how to map application dependencies
		• Create databases using different Database Management Systems (DBMS)
		• Demonstrate how to integrate database management systems with different sub-systems
		• Explain what is caching and discuss popular caching solutions
			• Whiteboard and Markers
			• LCD Projector and Laptop for presentations
			• Provision for word processor and presentation software
			• Lab equipped with the following:
			  ◦ PCs/Laptops
			  ◦ Chart paper and sketch pens
			  ◦ Internet with Wi-Fi (Min 2 Mbps Dedicated)

		• Explain what message queues are and why are they used • Demonstrate how to create micro-services • Demonstrate how to create reusable RESTful and secure APIs • Document the functionalities of backend APIs • Explain how to build scalable and reliable back-end systems • Discuss how to scale applications horizontally using auto-scaling and load balancing solutions • Demonstrate how to deploy back-end systems on cloud platforms (such as AWS, Azure etc.) • Explain how to manage security configurations of back-end applications • Demonstrate how to encrypt data in transit and data at rest • Discuss the concepts of Identity and Access Management (IAM) • Examine how to test back-end functionalist using scripts	

	ELECTIVE 3: Total Duration
	
	Theory Duration 10:00
	
	Practical Duration 30:00
		Unique Equipment Required
		• Whiteboard and Markers
		• LCD Projector and Laptop for presentations
		• Lab equipped with the following: -
		  • PCs/Laptops
		  • Internet with Wi-Fi (Min 2 Mbps Dedicated)
		  • Provision to write emails and send in the lab
		  • Chart paper, markers, picture magazines and old newspapers
		
		Popular Software Tools
		(At least one of the tools listed below is required)	

		Integrated Development Environments: Eclipse, Netbeans, Visual Studio, Atom etc. Application monitoring tools: Amazon Cloudwatch, Microsoft cloud monitoring, AppDynamics, Retrace etc. CI/CD tools: Jenkins, TravisCI, GitLab etc. Configuration management tools: Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo Workflow management tools: Evernote, Jira, VersionOne, Workzone, Scrum Mate etc.

	GRAND Total Duration
	
	Minimum duration for the QP = 360 hrs
	Theory: 124 hrs
	Practical: 236 hrs
	
	Maximum duration for the QP = 440 hrs
	Theory: 144 hrs
	Practical: 296 hrs
		Unique Equipment Required
		• Whiteboard and Markers
		• LCD Projector and Laptop for presentations
		• Lab equipped with the following: -
		  • PCs/Laptops
		  • Internet with Wi-Fi (Min 2 Mbps Dedicated)
		  • Provision to write emails and send in the lab
		  • Chart paper, markers, picture magazines and old newspapers
		
		Popular Software Tools
		(At least one of the tools listed below is required)
		
		Architecture design tools: Cloudkraft, Gliffy, Microsoft Visio, SmartDraw etc.
		Application monitoring tools: AppDynamics, Retrace etc.
		Configuration management tools: Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo
		Workflow management tools: Evernote, Jira, VersionOne, Workzone, Scrum Mate etc.

(This syllabus/ curriculum has been approved by SSC: IT- ITeS Sector Skills Council NASSCOM)

Trainer Prerequisites for Job role: "Application Developer – Web & Mobile" mapped to Qualification Pack: "SSC/Q8403, V1.0"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack SSC/Q8403, V1.0
2	**Personal Attributes**	This job may require the individual to work independently and take decisions for his/her own area of work. The individual should have a high level of analytical thinking ability, passion for web and Mobile Development technologies, and attention for detail, should be ethical, compliance and result oriented, should also be able to demonstrate interpersonal skills, along with willingness to undertake desk-based job with long working hours.
3	**Minimum Educational Qualifications**	Graduate in any discipline preferably Science/Computer Science/Electronics and Engineering /Information Technology
4a	**Domain Certification**	Certified for Job Role: "Application Developer – Web & Mobile" mapped to QP: "SSC/Q8403, V1.0". Minimum accepted score is 80%
4b	**Platform Certification**	Recommended that the trainer is certified for the Job role "Trainer" mapped to the Qualification Pack "MEP/Q2601". Minimum accepted score is 80% aggregate
5	**Experience**	5+ years of work experience/internship in Application Developer or related roles

Criteria For Assessment Of Trainees

Job Role Application Developer – Web & Mobile

Qualification Pack SSC/Q8403, V1.0

Sector Skill Council IT-ITeS

Guidelines for Assessment

1. 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 proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
6. To pass a QP, a trainee should score an average of 70% across generic NOS' and a minimum of 70% for each technical NOS
7. In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS Total Marks: 800				Marks Allocation	
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
1. SSC/N8417: Implement DevSecOps or continuous integration/continuous delivery practices for continuous deployment of applications	PC1. maintain and secure the repository for managing application source code	100	9	3	6
	PC2. manage changes to the application code/ source code through a version control system		11	3	8
	PC3. implement the procedures & policies for code tagging, branching, merger and integration		12	4	8
	PC4. integrate version control systems with the project management tools		12	4	8
	PC5. manage application environment variables and configuration for the target environment.		12	4	8
	PC6. automate application build testing/security through scripts and test automation tools		10	4	6
	PC7. test, identify, notify and fix build failure issues along with continuous integration		9	3	6
	PC8. implement application deployment policies and adhere to processes defined in the organization		9	3	6
	PC9. push applications to their appropriate services (such as web servers, API services,		8	2	6

	and database services etc.)				
	PC10. leverage appropriate automation tools to manage the CI/CD pipeline		8	2	6
	Total		**100**	**32**	**68**
2. SSC/N8125: Develop tests or simulations for end-to-end QA of systems	PC1. define functional requirements of the autonomous system	100	5	2	3
	PC2. establish the type of testing and testing requirements such as unit, sub-system, system etc.		5	2	3
	PC3. identify any issues with the requirements for testing and clarify these with appropriate people		5	2	3
	PC4. access reusable scenarios, test cases, scripts and tools from your organization's knowledge base		5	2	3
	PC5. create or modify test scenarios relevant to the requirements		10	3	7
	PC6. create or modify software test cases relevant to the requirements		10	3	7
	PC7. create or modify hardware test cases relevant to the requirements		10	3	7
	PC8. identify test cases that can be automated feasibly		5	2	3
	PC9. create or modify automated scripts relevant to the requirements		10	3	7

	PC10. access or create test data relevant to the requirements		5	2	3
	PC11. create a test plan to cover all the requirements		10	3	7
	PC12. run the simulated test cases and evaluate the outcomes		5	2	3
	PC13. communicate the outcomes of the tests or simulations with appropriate people and iterate		5	0	5
	PC14. create documentation on the tests or simulations for appropriate people		5	0	5
	PC15. validate the test plan, test cases and/or automated scripts with appropriate people		5	0	5
	Total		**100**	**29**	**71**
3. SSC/N8418: Fix application bugs and improve application performance	PC1. record the bug or enter it in the case tracking system	100	6	2	4
	PC2. identify what the user was doing, what they were expecting and what happened instead		8	2	6
	PC3. copy the error message and search for relevant solutions on developer forums		10	3	7
	PC4. determine the immediate line of code where the bug occurs		10	3	7
	PC5. identify the bug type (e.g., unexpected null, bad input, off-by-one, buffer overflow, index out-of-range, etc.)		10	3	7

	PC6. use the process of elimination to isolate the bug to a particular line of code		8	3	5
	PC7. disable blocks of code (comment them out) until the crash stops happening		8	3	5
	PC8. use a unit-testing framework to isolate methods		8	3	5
	PC9. continue to disable code and reduce the application to minimal functionality until it begins working again		8	2	6
	PC10. eliminate the hardware or platform as a cause		8	2	6
	PC11. log all activities and analyze the logs		8	2	6
	PC12. continue the isolation and logging processes until immediate line of code where bug occurs is identified		8	2	6
	Total		**100**	**30**	**70**
4 SSC/N8323: Monitor and manage applications and the deployed systems	PC1. define the business factors behind application performance monitoring requirements	100	10	3	7
	PC2. conduct an analysis to plan how to optimize applications in terms of cost and resource utilization		17	5	12
	PC3. define metrics to monitor application performance and health of deployed systems		17	5	12
	PC4. monitor application log reports		13	4	9

	for errors and clues about problems with the application and the deployed systems on cloud				
	PC5. assess and deploy appropriate application monitoring tools such as to monitor application performance		13	4	9
	PC6. perform analysis to generate consumable reports about application performance		13	4	9
	PC7. share application performance reports with relevant stakeholders		10	3	7
	PC8. provide actionable insights for re-engineering the application		7	2	5
	Total		**100**	**30**	**70**
5.SSC/N9005 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**	**80**
6. SSC/N9006 Build and maintain relationships at the workplace	PC1. build rapport with appropriate people at the workplace		10	3	7
	PC2. develop new professional relationships		10	3	7
	PC3. build alliances to establish mutually beneficial working arrangements		10	3	7
	PC4. foster an environment where others feel respected		10	4	6
	PC5. identify and engage a diverse range of influential contacts		10	4	6
	PC6. obtain guidance from appropriate people, where necessary		10	3	7
	PC7. attentively listen to ideas and give constructive feedback		10	3	7

	PC8. promptly resolve conflicts between team members		10	2	8
	PC9. work with colleagues to deliver shared goals		10	2	8
	PC10. recognize the contributions made by your colleagues		10	3	7
	Total		**100**	**30**	**70**
7. SSC/N9010 Convince others to take appropriate action in different situations	PC1. gather needs of concerned people		10	0	10
	PC2. adapt arguments to consider diverse needs		15	0	15
	PC3. use small wins as milestones to gain support for ideas		25	10	15
	PC4. persuade with the help of concrete examples or evidences		25	10	15
	PC5. take defined steps to reach a consensus on the course of action		25	10	15
	Total		**100**	**30**	**70**
8. SSC/N9012 Manage and collaborate with stakeholders for project success	PC1. identify the larger business and organizational context behind the requirements of the stakeholder		10	3	7
	PC2. manage fluctuating stakeholder priorities and expectations		5	1	4
	PC3. consult stakeholders early in critical organization-wide decisions		10	3	7
	PC4. use formal communication methods to collaborate with stakeholders (such		5	1	4

	as meetings, conference calls, emails etc.)				
	PC5. keep stakeholders updated on changes in project requirements		10	3	7
	PC6. define the frequency of communication with all the stakeholders		10	3	7
	PC7. use suitable tools to represent numbers and pictures to present details		10	3	7
	PC8. respond to requests in a timely and accurate manner		10	3	7
	PC9. take feedbacks from stakeholders regularly		5	1	4
	PC10. continuously improve work deliverables/service based on stakeholder feedback		15	5	10
	PC11. plan deliverables based on stakeholder needs		10	3	7
	Total		**100**	**29**	**71**

ELECTIVES					
ELECTIVE 1: Front-end Web Development					
Total marks: 100				**Marks Allocations**	
Assessment Outcome	**Assessment Criteria for outcomes**	**Total Marks**	**Out of**	**Theory**	**Skills Practical**
1. SSC/N8414: Develop consistent and user-friendly web app for the target platform aligned to the functional, non-functional and user experience requirements	PC1. collaborate with cross functional teams to understand the scope	**100**	6	2	4
	PC2. understand and analyzed the functional, non-functional and user experience requirements with		7	2	5

	which the interface must be developed				
	PC3. create list of tasks that the user can execute within the interface based on the requirements identified		7	2	5
	PC4. organize the list of tasks and interfaces needed for the overall application		7	2	5
	PC5. create a pre-list of possible re-usable components before starting the development		7	2	5
	PC6. develop web prototypes based on the flows identified		9	3	6
	PC7. define the structure of the pages, the headers, the sections, the articles, main, footer, etc.		12	4	8
	PC8. develop codes for the various pages, the headers, the sections, the articles, main, footer, etc.		12	4	8
	PC9. develop application code as per the security requirements		12	4	8
	PC10. design and develop unit tests for the application code		12	4	8
	PC11. build, run and test the application before deployment		12	3	6
	Total		**100**	**32**	**68**
ELECTIVES					
ELECTIVE 2: Mobile Application Development					
Total marks: 100				**Marks Allocations**	

Assessment Outcome	Assessment Criteria for outcomes	Total Marks	Out of	Theory	Skills Practical
1. SSC/N8415: Develop native/cross-platform/hybrid mobile application for the target platforms	PC1. obtain information about the mobile solution, the user and similar market solutions	**100**	5	2	3
	PC2. identify the functional, non-functional and user experience requirements of the mobile application		7	2	5
	PC3. identify dependencies related to application development (such as time to market, access to device hardware functionalities, support for third-party integrations etc.)		7	2	5
	PC4. develop application code as per the security requirements		11	3	8
	PC5. encrypt data to ensure the security of data whenever applicable		9	3	6
	PC6. manage security configuration of the application and ensure regulatory compliances are met		7	2	5
	PC7. design and develop unit tests for the application code		9	3	6
	PC8. build, run and test the application before deployment		9	3	6
	PC9. develop capabilities in the platform to enable A/B testing of product/features		9	3	6

	PC10. create and maintain service configurations for deployment of application code/ source code		11	3	8
	PC11. automate the deployment process through scripts and tools		11	3	8
	PC12. publish the mobile application on to the respective application platform/ app-store		5	2	3
	Total		**100**	**31**	**69**
ELECTIVES					
ELECTIVE 3: Back-end Development					
Total marks: 100				**Marks Allocations**	
Assessment Outcome	**Assessment Criteria for outcomes**	**Total Marks**	**Out of**	**Theory**	**Skills Practical**
1. SSC/N8416: Develop reliable, scalable and secure back-end aligned to the application architecture	PC1. demarcate backend and frontend responsibilities before the start of application development	**100**	6	2	4
	PC2. identify scope of backend operations and functionalities		8	2	6
	PC3. design server endpoints that can be used to connect with client		10	3	7
	PC4. create stubs for both upstream and backstream to have a working backend		10	3	7
	PC5. document what every backend API endpoint must do		5	2	3
	PC6. document what kind of values need to be provided by the		5	2	3

	client, and will be returned by the backend				
	PC7. specify which values are mandatory and which ones are optional		5	2	3
	PC8. ensure that documentation is kept up to date		5	2	3
	PC9. document to design the database schema		5	2	3
	PC10. ensure that the above processes are performed in line with defined reliability and scalability requirements		8	2	6
	PC11. write test scripts that verify if all backend endpoints are working		10	3	7
	PC12. build the API using a selected programming language		13	4	9
	PC13. deploy backend using a cloud service or a dedicated host		10	3	7
	Total		**100**	**32**	**68**