

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR TELECOM INDUSTRY

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

Contact Us:

2nd Floor, PLOT :
105, Sector - 44,
GURGAON - 122003
T: 0124 - 4148029
E-mail:
tssc@tsscindia.com



Contents

1. Introduction and Contacts.....	1
2. Qualifications Pack.....	2
3. OS Units.....	3
4. Glossary of Key Terms.....	4
5. AssessmentCriteria	19

Introduction

Qualifications Pack- Telecom Terminal Equipment Application Developer (Android)

SECTOR: TELECOM

SUB-SECTOR: Handset (Terminal Applications)

OCCUPATION: TERMINAL EQUIPMENT APPLICATION DEVELOPER

REFERENCE ID: TEL/Q2300

ALIGNED TO: NCO -2015/2153.0101

Brief Job Description: Telecom Terminal Equipment Application Developer is responsible for creating Applications for Android platform that can be used on Smartphone and Tablets running on Android Operating System. The developer handles end-to-end activities for application development ranging from installing requisite frameworks, setting-up of development environment, developing apps, security frameworks, testing and deployment.

Personal Attributes: This job requires the individual to have good programming skills in Java, multithreading and operating system concepts. Problem solving & analytical skills and their translation to specified outcome and additionally expected.

Job Details

Qualifications Pack Code	TEL/Q2300		
Job Role	Telecom Terminal Equipment Application Developer (Android)		
Credits (NSQF)	TBD	Version number	2.0
Sector	Telecom	Drafted on	12/06/2016
Sub-sector	Handset (Terminal Applications)	Last reviewed on	12/06/2016
Occupation	Android Application Developer	Next review date	12/08/2018
NSQC Clearance on	DD/MM/YYYY		

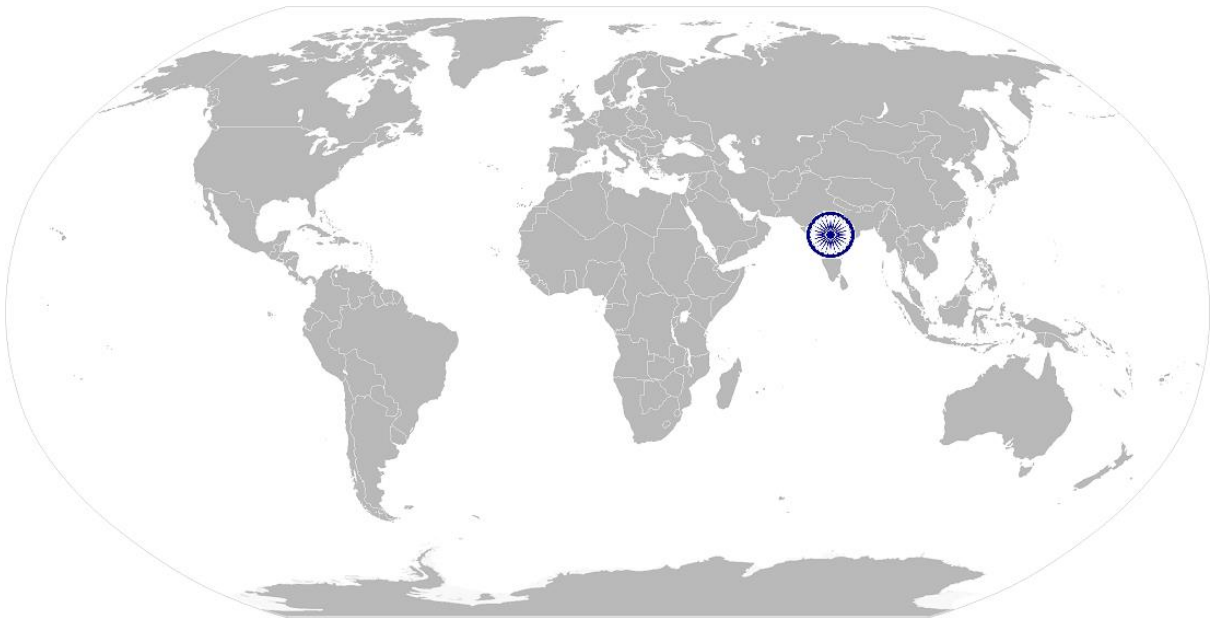
Job Role	Telecom Terminal Equipment Application Developer (Android)
Role Description	Telecom Terminal Equipment Application Developer is responsible for development of mobile application for smartphones and Tablets running Android OS.
NSQF level	4
Minimum Educational Qualifications*	12 th class, Preferably
Maximum Educational Qualifications*	ITI Diploma, Engineering Graduates, BSc.Computer Science, B.Tech
Training (Suggested but not mandatory)	Practical knowledge of Java programming language is essential.
Experience	NA
Minimum entry Job Age	18 Years
Experience	NIL
Applicable National Occupational Standards (NOS)	Compulsory: 1. TEL/N2300 (Set-up up Android framework/development environment and creating user interface) 2. TEL/N2301 (Developing Android VAS Application) 3. TEL/N2302 (Testing and Publishing Android Applications)
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard, which is denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronym	Keywords /Terms	Description
	JDK	Java Development Kit
	IDE	Integrated Development Environment
	SDK	Standard Development Kit
	ADT	Android Development Tools
	ADV	Android Virtual Devices
	UI	User Interface
	API	Application Programming Interface
	SQL	Standard Query Language
	SMS	Short Message Services
	VAS	Value Added Services
	SHE	Safety Health & Environment
	OHS	Operational Health & Safety

National Occupational Standard



Overview

This unit is about setup of development framework and environment, creating projects and adaptive & responsive user interface.

TEL/N2300 Setup of Android Framework/Development Environment and creating User Interface

National Occupational Standard

Unit Code	TEL/N2300
Unit Title (Task)	Android framework/environment setup and project essentials
Description	This unit is about Setting up the Android Application Development environment, project essentials and creating adaptive and responsive user interface
Scope	This unit/task covers the following: - Understanding the Android Application Development Framework - Setting up Android Application Development Environment - Creating Android Projects - Creating adaptive and responsive user interface and deploying on an emulator or device
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Understanding the Android Application Development Framework	To be competent, the user/individual on the job must be able to PC1. differentiate various Mobile operating Systems , key features and benefits PC2. identify key features for various versions of Android PC3. identify the various tools and software required for developing an Android Application
Setting up Android Application Development Environment	PC4. install Java PC5. install and configure Android development framework PC6. create Android Virtual Devices PC7. identify the components of an Android Project
Creating Android Projects	PC8. create Android Project PC9. identify and understand features of system libraries and files related to the installed framework
Creating adaptive and responsive User Interface and deploying on an emulator or device	PC10. understand and link activities & Intents PC11. apply Styles and themes to activities PC12. start activities using intents PC13. understand parent child activity relationship PC14. understand the components of a Screen, Views and view Groups PC15. understand Layouts PC16. work with emulators PC17. understand Display orientation, views and sizing (for various devices) PC18. creating User Interfaces programmatically PC19. implement event listeners PC20. create Basic Views PC21. display of images PC22. use Menus , Helper Methods, Options Menu and Context Menu PC23. understand basics of working with Android camera

TEL/N2300 Setup of Android Framework/Development Environment and creating User Interface

Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. project Management concepts and applications KA2. risk and impact of not following defined procedures/work instructions KA3. escalation matrix for reporting identified incidents, troubles and/or emergencies e.g. system failures ,fire and power failures KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. object Oriented Programming KB2. java Programing concepts KB3. mobile operating systems (features, compatibility, versions etc) KB4. mobile app development frameworks, environment and features KB5. framework file structures, features and hierarchy KB6. application security features and compliances
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. write system concepts and requirement specifications SA2. write application flow diagrams and charts
	Reading Skills
	The user/ individual on the job needs to know and understand how to: SA3. read technical literature/parameters SA4. read and understand application requirement specifications SA5. read and understand specifications of various android versions
	Oral Communication (Listening and Speaking Skills)
	The user/ individual on the job needs to know and understand how to: SA6. communicate with colleagues, peers and customers/stakeholders SA7. liaisoning and coordination skills SA8. probe customers using appropriate open and close ended questions to understand the nature of problem, without any pre-conclusions

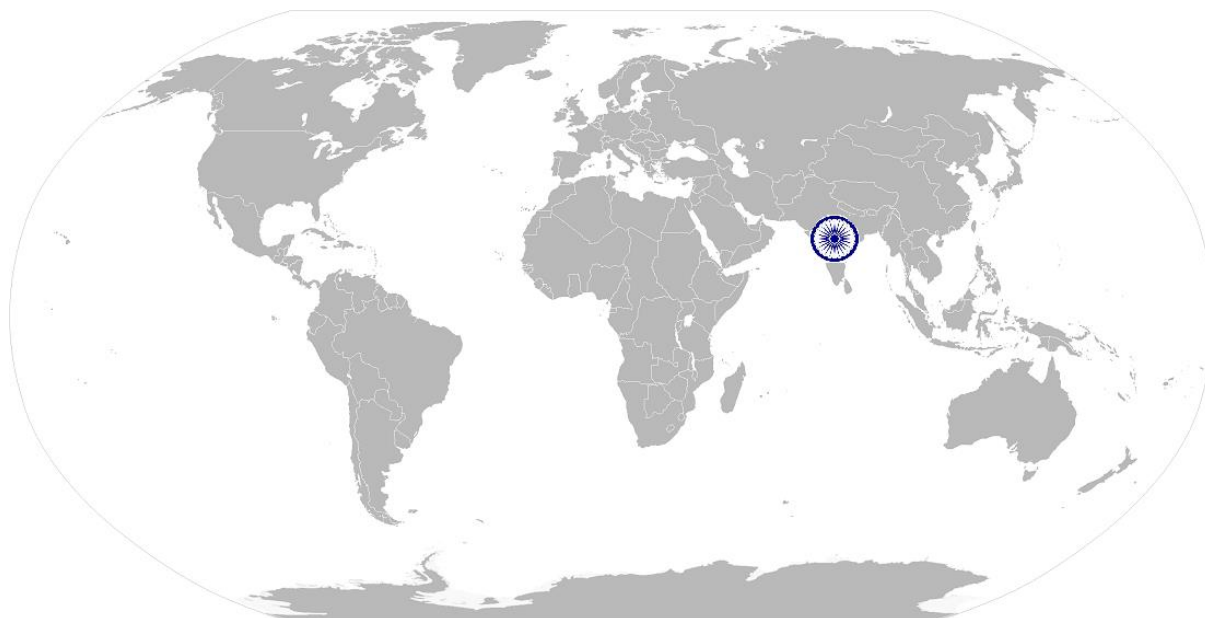
TEL/N2300 Setup of Android Framework/Development Environment and creating User Interface

B. Professional Skills	Decision Making
	Not Applicable
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. plan the development activities SB2. organize all hardware/software components required for setup SB3. plan testing and deployment activities SB4. time and work management
	Customer Centricity
	Not Applicable
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. read and comprehend/understand equipment installation manual SB6. interpret Application Requirements SB7. interpret UI requirements SB8. develop System flow and coding
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB9. analyse system requirements and install Java and Android SB10. undertake requirement understanding, SB11. conceptualizing applications SB12. work-out document process flow
	Critical Thinking
	Not Applicable

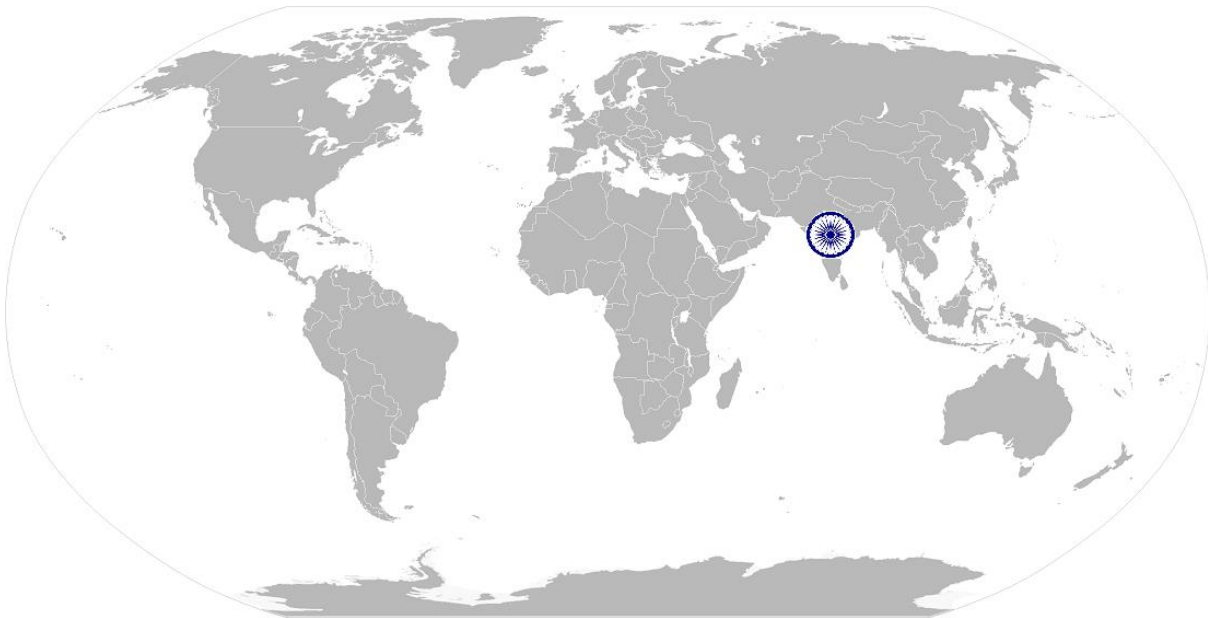
TEL/N2300 Setup of Android Framework/Development Environment and creating User Interface

NOS Version Control

NOS Code	TEL /N2300		
Credits (NSQF)	TBD	Version number	2.0
Industry	Telecom	Drafted on	12/06/2016
Industry Sub-sector	Handset (Terminal Application)	Last reviewed on	12/08/2016
Occupation	TBD	Next review date	12/08/2018



National Occupational Standard



Overview

This unit is about developing applications along with data sources, content and network interfaces

TEL/N2301

Developing Android VAS Applications

National Occupational Standard

Unit Code	TEL/N2301
Unit Title (Task)	Developing applications and interfaces
Description	Involves in working with Data sources, Databases, Content Providers, Messaging Services, Email Services, Networking Services, Location Based Services, Creating customized Android applications & services
Scope	This unit/task covers the following: • Data Handling • Messaging and Networking • Location Based Services • Developing Android Services ensuring backward compatibility
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Data Handling	To be competent, the user/individual on the job must be able to PC1. implementing Data Persistence PC2. sharing and Loading user Preferences PC3. storing Data to internal Storage, External Storage PC4. test data connectivity PC5. using Database PC6. applying commands to query data PC7. use of loaders to load database PC8. bundling Database with Application PC9. using Content Providers & resolvers to provide an interface to the app's data
Messaging and Networking	PC10. sending SMS messages programmatically/using intent PC11. receiving SMS and Processing SMS PC12. sending Email PC13. working with Bluetooth PC14. downloading Text Files, Binary Data, Accessing Web Services PC15. performing Asynchronous Calls
Location Based Services	PC16. understanding the MAP concept for Android and Creating a MAP Project PC17. obtaining the Maps API Keys, Displaying the Map PC18. controlling the Zoom and changing the Views PC19. navigating to specific locations PC20. adding Markers PC21. getting a locations that was touched PC22. geo coding and reverse Geo-coding PC23. monitoring Locations
Developing Android Services ensuring backward compatibility	PC24. creating your Own Android Services PC25. performing Long-Running tasks, Repeated Tasks, Asynchronous Tasks in a service PC26. communicating between a Service and Activity PC27. building Activities into Services PC28. understand how Android prioritizes tasks

TEL/N2301

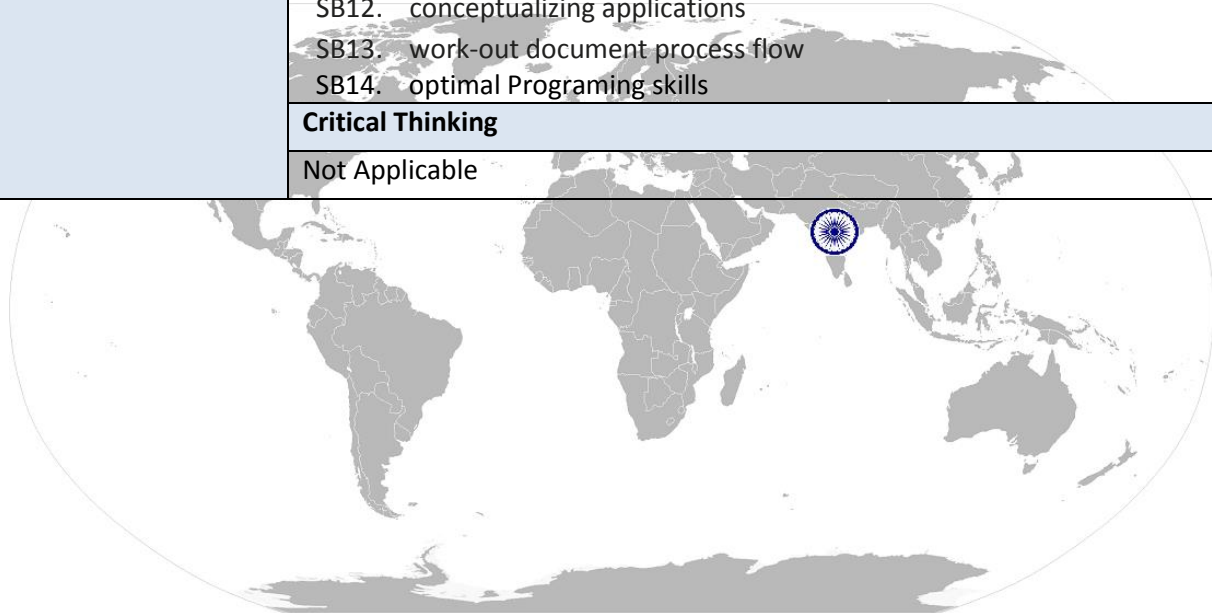
Developing Android VAS Applications

	PC29. implement alarms PC30. understand the concepts of efficient data transfer to minimize battery drain
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. project Management concepts and applications KA2. risk and impact of not following defined procedures/work instructions KA3. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. java Programing (OOPS, Classes and Objects, Multithreading, Inheritance, Networking etc) KB2. working with Object Oriented Databases KB3. database interfaces KB4. networking fundamentals
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. fill up appropriate technical forms, activity logs in required format of the company SA2. technical writing (flow, process steps etc)
	Reading Skills
	The user/ individual on the job needs to know and understand how to: SA3. read technical literature/requirements SA4. read and understand manuals, work orders, health and safety instructions, memos, reports etc.
	Oral Communication (Listening and Speaking Skills)
	The user/ individual on the job needs to know and understand how to: SA5. communicate with colleagues, peers management and stakeholders SA6. liaisoning and coordination skills
B. Professional Skills	Decision Making
	Not Applicable
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. plan the development activities SB2. organize all hardware/software components required for setup SB3. plan testing and deployment activities SB4. time and work management
	Customer Centricity

TEL/N2301

Developing Android VAS Applications

	Not Applicable
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. read and comprehend/understand equipment installation manual SB6. interpret Application Requirements SB7. interpret UI requirements SB8. develop System flow and coding SB9. working with various networking protocols as per the application requirement
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB10. analyse system requirements and install Java and Android SDK SB11. undertake requirement understanding, SB12. conceptualizing applications SB13. work-out document process flow SB14. optimal Programing skills
	Critical Thinking
	Not Applicable

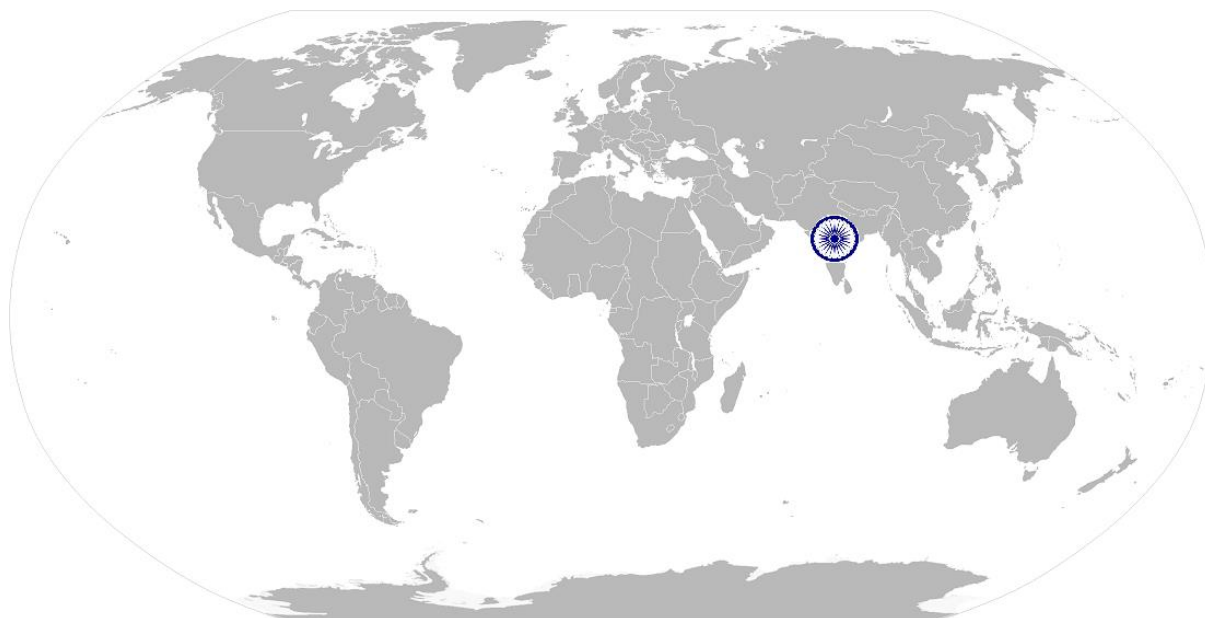


TEL/N2301

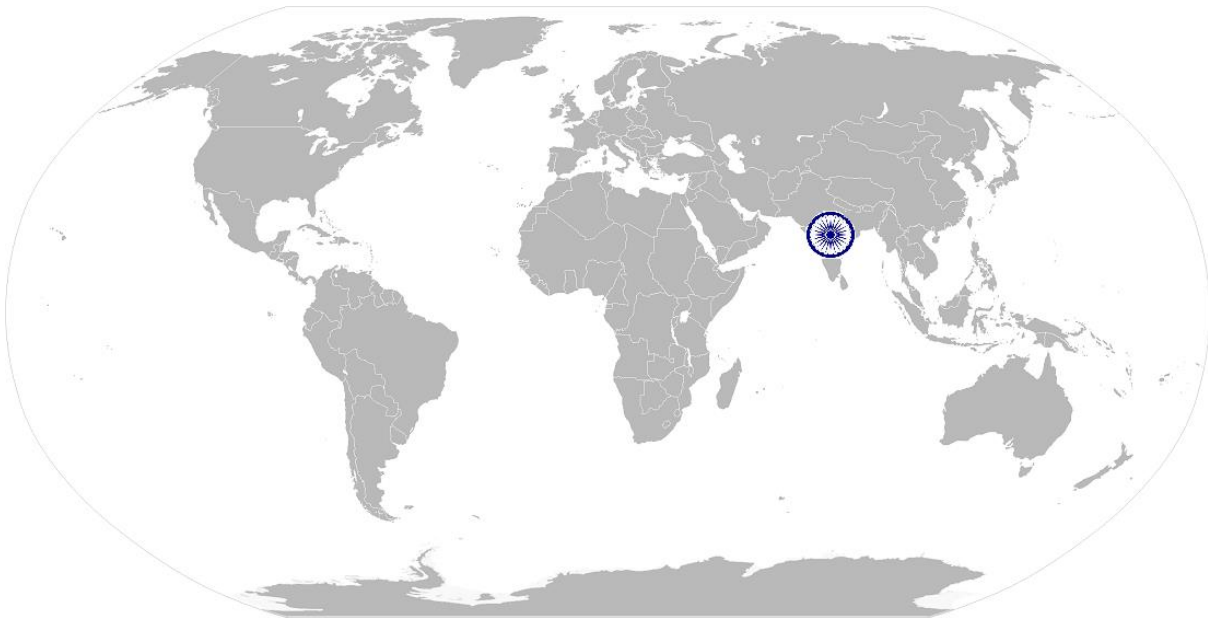
Developing Android VAS Applications

NOS Version Control

NOS Code	TEL /N2301		
Credits (NSQF)	TBD	Version number	2.0
Industry	Telecom	Drafted on	12/06/2016
Industry Sub-sector	Handset (Terminal Application)	Last reviewed on	12/08/2016
Occupation	TBD	Next review date	12/08/2018



National Occupational Standard



Overview

This unit is about Testing, de-bugging and Publishing Android Applications

TEL/N2302

Testing and Publishing Android Application

National Occupational Standard

Unit Code	TEL/N2302
Unit Title (Task)	Testing and Publishing Android Applications
Description	This unit is about testing, debugging and publishing android applications
Scope	This unit/task covers the following: - Android Application Testing & debugging - Securing Android Applications - Publishing Android Applications
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Android Application Testing & debugging	To be competent, the user/individual on the job must be able to PC1. testing fundamentals, Type of Tests, define/write App specific test cases PC2. testing Android Application using Unit Testing PC3. functional /Usability Testing Android Applications PC4. UI Testing PC5. performance Testing PC6. battery Impact analysis PC7. troubleshoot and debug code
Securing Android Applications	PC8. understand built-in security features of Android framework PC9. pre-publishing checks and addressing vulnerabilities PC10. security Best Practices for Android VAS Applications
Publishing Android Applications	PC11. bundle application for release on app store PC12. publishing procedure/processes PC13. store licensing policies PC14. options for monetization strategies
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. project Management concepts and applications KA2. risk and impact of not following defined procedures/work instructions KA3. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures KA4. records to be maintained and implications of non-maintenance of the same KA5. SHE and OHS guidelines and regulations as per company's norms
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. type of application testing methodologies and associated processes KB2. debugging methodologies and re-testing process KB3. compliance process/procedures and tests for hosting application at app stores KB4. tools for application functional and security testing

TEL/N2302

Testing and Publishing Android Application

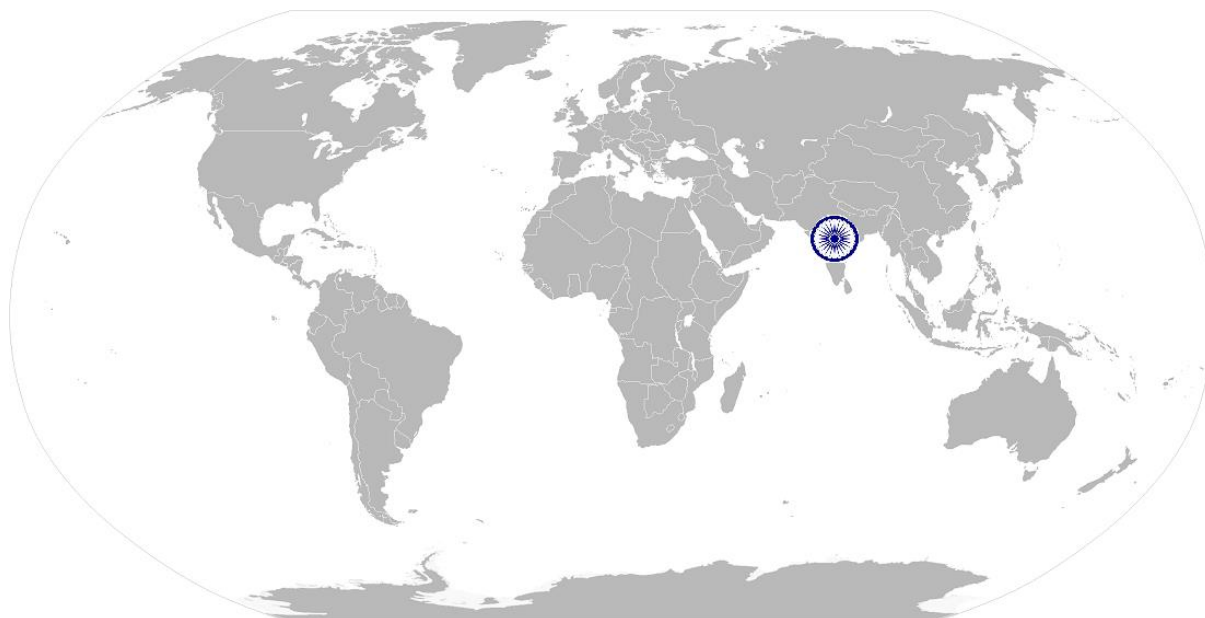
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. write system concepts for testing and debugging SA2. record performance/test results SA3. maintain proper records as per given format
	Reading Skills
	The user/ individual on the job needs to know and understand how to: SA4. read technical documentation
	Oral Communication (Listening and Speaking Skills)
	The user/ individual on the job needs to know and understand how to: SA5. communicate with stakeholders SA6. liasoning and coordination skills
B. Professional Skills	Decision Making
	Not Applicable
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB1. plan the development activities SB2. organize all hardware/software components required for setup SB3. plan testing and deployment activities SB4. time and work management
	Customer Centricity
	Not Applicable
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. install and use testing and debugging tools SB6. design appropriate test cases SB7. obtain test results for analysis and corrective action SB8. technical appreciation of licencing, publishing policies
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB9. analyse results and debug SB10. formulate test strategy and test cases SB11. setup application testing environment
	Critical Thinking
	Not Applicable

TEL/N2302

Testing and Publishing Android Application

NOS Version Control

NOS Code	TEL /N2302		
Credits (NSQF)	TBD	Version number	2.0
Industry	Telecom	Drafted on	12/06/2016
Industry Sub-sector	Handset (Terminal Application)	Last reviewed on	12/08/2016
Occupation	TBD	Next review date	12/08/2018



TEL/Q2300 Qualifications Pack for Telecom Terminal Equipment Application Developer (Android)

Criteria for Assessment of Trainee

Job Role : Telecom Terminal Equipment Application Developer (Android)
Qualification Pack : TEL/Q2300
Sector Skill Council : Telecom

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. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/training center.
4. To pass the Qualification Pack, every trainee should score a minimum 70% in every NOS.
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcome	Assessment Criteria	Total Mark (300)	Out Of	Theory	Skills Practical
TEL/N2300 Understanding the Android Application Development Framework	PC1. differentiate various Mobile operating Systems, key features and benefits	100	4	4	0
	PC2. identify key features for various versions of Android		4	4	0
	PC3. identify the various tools and software required for developing an Android Application		4	4	0
Setting up Android Application Development Environment	PC4. install Java		6	3	3
	PC5. install and configure Android development framework		3	1	2
	PC6. create Android Virtual Devices		3	1	2
	PC7. identify the components of an Android Project		3	2	1
Creating Android Projects	PC8. create Android Project		4	3	1
	PC9. identify and understand features of system libraries and files related to the installed framework		4	1	3
Creating adaptive and responsive User Interface and deploying on an emulator or device	PC10. understand and link activities and intents		3	2	1
	PC11. apply Styles and themes to activities		5	2	3
	PC12. start activities using Intents		3	1	2
	PC13. understand parent child activity relationship		3	1	2
	PC14. understand the components of a Screen, Views and view Groups		7	3	4
	PC15. understand Layouts		5	2	3
	PC16. work with emulators		4	1	3
	PC17. Understand Display orientation, views and sizing (for various devices)		5	2	3
	PC18. Creating User Interfaces programmatically		4	1	3
	PC19. Implement event listeners		3	1	2
	PC20. Create Basic Views		5	1	4
	PC21. display of images		5	2	3
	PC22. Use Menus, Helper Methods, Options Menu and Context Menu		5	2	3
	PC23. Understand basics of working with Android camera		8	2	6
Total				46	54

TEL/Q2300 Qualifications Pack for Telecom Terminal Equipment Application Developer (Android)

TEL/N2301 Data Handling	PC1. implementing Data Persistence	100	5	2	3
	PC2. sharing and Loading user Preferences		4	2	2
	PC3. storing Data to internal Storage, External Storage		3	2	1
	PC4. Test data connectivity		3	1	2
	PC5. using Database		3	2	1
	PC6. applying commands to query data		6	3	3
	PC7. Use of loaders to load database		5	2	3
	PC8. bundling Database with Application		3	1	2
	PC9. using Content Providers and resolve to provide an interface to the app's data		2	1	1
Messaging and Networking	PC10. sending SMS messages programmatically/using intent		3	1	2
	PC11. receiving SMS and Processing SMS		3	0	3
	PC12. sending Email		2	0	2
	PC13. working with Bluetooth		3	1	2
	PC14. downloading Text Files, Binary Data, Accessing Web Services		2	1	1
	PC15. performing Asynchronous Call		3	1	2
Location Based Services	PC16. understanding the MAP concept for Android and creating a MAP Project		7	4	3
	PC17. obtaining the Maps API Keys, Displaying the Map		3	1	2
	PC18. controlling the Zoom and changing the Views		3	1	2
	PC19. navigating to specific locations		3	1	2
	PC20. Adding Markers		3	1	2
	PC21. getting a locations that was touched		3	1	2
	PC22. geo coding and reverse Geocoding		1	1	0
	PC23. monitoring Locations		3	1	2
Developing Android Services ensuring backward compatibility	PC24. creating your Own Android Services		3	2	1
	PC25. performing Long-Running tasks, Repeated Tasks, Asynchronous Tasks in a Service		3	1	2
	PC26. communicating between a Service and Activity		3	1	2
	PC27. building Activities into Services		3	1	2
	PC28. understand how Android prioritizes tasks		3	2	1
	PC29. implement alarms		6	3	3
	PC30. understand the concepts of efficient data transfer to minimize battery drain		3	0	3
Total				41	59
TEL/N2302 Android Application Testing & debugging	PC1. testing fundamentals, Types of Tests, define/wite App specific test cases	100	8	5	3
	PC2. testing Android Application using Unit Testing		8	3	5
	PC3. functional /Usability Testing Android Applications		8	3	5
	PC4. ui Testing		8	3	5
	PC5. performance testing		8	3	5
	PC6. battery Impact analysis		8	5	3
	PC7. troubleshoot and debug code		10	3	7
Securing Android Applications	PC8. understand built-in security features of Android framework		2	2	0
	PC9. Pre-publishing checks and addressing vulnerabilities		10	5	5

TEL/Q2300 Qualifications Pack for Telecom Terminal Equipment Application Developer (Android)

	PC10. Security Best Practices for Android VAS Applications		10	5	5
Publishing Android Applications	PC11. bundle application for release on app store		10	6	4
	PC12. publishing procedure/processes		4	4	0
	PC13. store licensing policies		4	4	0
	PC14. options for monetization strategies		2	2	0
Total				53	47
Grand Total		300			